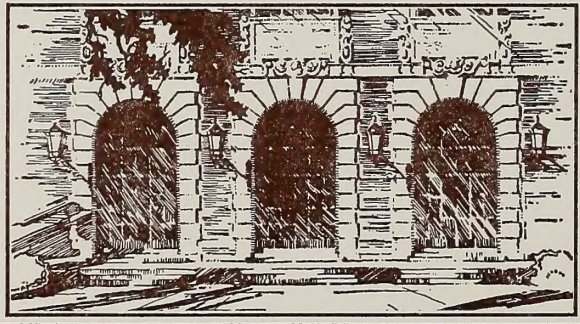


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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

FEBRUARY 1956

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No. 1

This is the first issue of AGRONOMY NEWS, a companion publication to "Agronomy Facts." As a result of three years' experience in publishing the Facts sheets, a series of short articles giving basic information to technical workers in agriculture, it became increasingly clear that there was a need for a different type of information service.

AGRONOMY NEWS will bring you reports on current activities in the field as reported by the Agronomy staff. You will get progress reports on crop management and discuss them when new research studies are completed. You will receive reports on the activities of state and regional agricultural organizations.

This volume is bound without nos. 5, 22, 66,
424, 440, and 443

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state and federal agencies dealing with agronomy. It is anticipated that wider distribution will be made of certain issues containing items of special interest. Distribution will be governed by the nature of the material and the demands of readers.

We are anxious to make this publication a useful and effective medium for reporting the work and accomplishments of the Department of Agronomy to those interested. If you would like to have your name placed on the mailing list for AGRONOMY NEWS, write to the Department of Agronomy, University of Illinois, at Urbana.

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AGRONOMY NEWS will bring you reports on current activities in the teaching, research, and extension programs carried on by the Agronomy staff. The NEWS will give you timely tips on soils and crop management and discuss other agronomic topics of current interest. You will get progress reports on present research activities and will be informed when new research studies are initiated. From time to time you will receive reports on the activities of the agronomy staff who are working on projects of state and regional significance.

Since much of the information released by the Agronomy Department appears first as progress reports in mimeographed leaflets which are not usually included in any publication list, the AGRONOMY NEWS will occasionally carry a list of available mimeographed publications.

Although no fixed release schedule is being promised, present plans call for a minimum of one issue per month and at more frequent intervals if the situation warrants. AGRONOMY NEWS will be sent to county extension personnel, vo-ag instructors, and technical field personnel of other state and federal agencies dealing with agronomy. It is anticipated that wider distribution will be made of certain issues containing items of special interest. Distribution will be governed by the nature of the material and the demands of readers.

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AGRONOMY

CROPS AND SOILS

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COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 5, 1956

SPRING GRAINS IN ILLINOIS

No. 2

Oats

Most farmers raising oats for grain in Illinois like the varieties they grow to have (1) ability to yield well, (2) early maturity, (3) heat tolerance, (4) strong, stiff straw, (5) disease resistance, and (6) high-quality grain. The following varieties are the best we have at present with respect to these characteristics and so are recommended for Illinois:

Northern: Bonda, Branch, Clarion, Clintland, Clinton 11 Lot 25, Clinton 59, Logan, Nemaha, Newton, Sauk, Waubay.

Central: Clarion, Clintland, Clinton 11 Lot 25, Clinton 59, Logan, Nemaha, Newton, Missouri 0-205, Waubay.

Southern: Andrew, Bentland, Logan, Missouri 0-205.

Note: Branch, Nemaha, Missouri 0-205, and Sauk are more likely to lodge under high-fertility conditions than are other recommended varieties. Yield data and detailed descriptions of varieties may be found in Illinois Circular 754 - Spring Oats in Illinois.

Buying and handling seed: High prices, unknown varieties, and unknown seed sources should be avoided. A good motto is, "If you do not know your seeds, know your seedsman." Certified seed gives the best results. A high germination rate is characteristic of good seed. Cleaning and treating seed (with Panogen or Ceresan M) are profitable practices. (See AG1639 - Oat and Wheat Seed Treatments.)

Seedbed preparation: Disked soybean stubble makes an excellent seedbed for oats. Second best is cornstalk land, plowed to control scab disease and destroy corn borers.

Fertilization: There is no prescription for fertilizing oats that will fit every situation. Reliable soil tests tell which nutrients and how much are needed. (See Circular 724 - Soil Treatment Recommendations Based on Soil Tests.) Establishing good stands of forage grasses and legumes in oats depends on liming (if soil is acid) and adding phosphate and potash (if these nutrients are shown to be lacking in soil test). Where soils are definitely low in nitrogen, adding 20 to 25 pounds of nitrogen may increase oat yields. Extra-high nitrogen applications are likely to cause severe lodging or excessive straw growth, with resultant yield reduction and smothering of seeding.

(Continued)

Planting: Oats should be planted deep enough to be covered with moist soil. Drilling allows the seed to be placed at a uniform depth and, in Illinois tests, has resulted in yield increases of 5 to 10 bushels per acre over broadcasting. Broadcasting may have some advantages under certain conditions in that a broadcast seeder is cheaper, plants faster, and can be used under a wider range of soil moisture conditions than a drill.

Planting rate: Eight pecks per acre is the recommended rate for drilling oats. Ten to twelve pecks per acre is most satisfactory for broadcast seeding.

Oat variety demonstrations can be observed this spring and summer in the following counties: Boone, Brown, Bureau, Carroll, Christian (2), Clinton, Coles, DeWitt, Douglas, DuPage (2), Edgar, Edwards, Fulton, Grundy (5), Hamilton, Hancock, Henderson, Henry (2), Iroquois, Jo Daviess, Kane, Kankakee (2), Kendall, Knox (3), Lake, LaSalle, (3), Livingston (2), Macon, Macoupin, Marshall-Putnam, Mason, McDonough (2), Mercer, Morgan, Moultrie, Ogle, Peoria, Rock Island (2), Sangamon, Schuyler, Shelby, Stark, Stephenson, Tazewell, Warren, Washington, Whiteside, Winnebago, and Woodford.

Note: Numbers in parentheses indicate that more than one demonstration will be held in a particular county.

These demonstrations will give those who are interested a chance to observe several varieties, both recommended and not recommended, growing together. County farm advisers will supply the exact locations of the variety demonstrations on request and will also announce the times at which meetings will be held at the demonstration plots to discuss the merits and demerits of the varieties present.

Other Spring Grains in Brief

Barley: Varieties recommended for northern Illinois:

Kindred, Moore (feed only), and Oderbrucker. Planting rate: 6-8 pecks.

(See AG1613 - Spring Barley in Illinois.)

Spring Wheat: Varieties recommended for northern Illinois:

Henry (for feed only), Lee, Rival. Planting rate: 6-8 pecks.

Barley and spring wheat are adapted to northern Illinois only. In general the cultural practices suggested for oats are also applicable to barley and spring wheat. Early planting of spring wheat and barley is especially important, since they are not very heat tolerant.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 12, 1956

DUST MIXTURES OF 2,4-D AND SOME MINOR ELEMENTS

No. 3

A considerable amount of excitement has been stirred up in Illinois in recent months over the use of 2,4-D and trace mineral (minor element) dust mixtures to control weeds. These mixtures are reputed in some circles to have (1) good weed control properties and, in addition, (2) the ability to stimulate crops and increase yields. We wish to suggest a more conservative approach to this problem.

If 2,4-D and trace mineral dust mixtures produce substantial yield increases (which has not yet been determined experimentally at this or other experiment stations), they probably do so in one or more of three ways:

1. By controlling weeds and thus reducing the competition for light, moisture, and nutrients by weeds.
2. By adding minor nutrients where they are actually deficient for optimum crop yields.
3. By providing some component or effect of the combination that we do not now know about.

Let's consider these possibilities separately:

1. Preliminary tests made by Dr. F. W. Slife of the Department of Agronomy, University of Illinois, who has been repeatedly misquoted on this matter, indicate that the dusts are about equal to regular 2,4-D formulations in ability to control weeds. Thus if the price per pound of 2,4-D acid supplied by the dust is as low as, or lower than, that supplied by other formulations, its use might well be profitable from the weed-control standpoint.

2. Extensive analyses of plant tissue from all parts of Illinois have given us a pretty good picture of the status of minor elements in our soils (see AG1674 - The Status of Minor Elements in Illinois Soils). Apparently our soils are well supplied with iron, manganese, copper, zinc, and molybdenum. Deficiencies are very rare. Boron deficiencies occur in several parts of the state. Soils that are suspected of being deficient in boron are tested for boron by our soil testing laboratory. Where tests indicate low boron, applications of at least 20 pounds of borax are recommended. This is several times the amount supplied by average applications of the dust mixtures. Where trace elements are needed, the price per pound of the element in question should determine whether it can best be provided by 2,4-D-trace mineral dust mixtures or by other commercial carriers.

3. Does the mixture have a stimulatory effect? Time and extensive physiological tests and field trials may determine whether many of the theories now being expounded are facts. Results of 1955 tests of the dust mixtures at Illinois are as follows: (a) Test 1: 7 pounds of commercial material applied to corn 10 inches tall with a commercial duster; three replications, three yield tests made in each replication. Result - treated area produced 100.7 bushels an acre; untreated area, 106.2 bushels. (b) Test 2: 6 pounds applied at corn heights of 8, 24, and 36 inches, some plots receiving only the initial application, some receiving two applications, and some receiving all three. Result - one application, 107.8 bushels; two applications, 111 bushels; three applications, 105.5 bushels; check plot (no treatment), 106.3 bushels. It should be emphasized that these are only one year's results and additional tests are needed.

We suggest the following procedure for analyzing claims, stories, etc., about 2,4-D and trace mineral dusts that come to your attention:

1. Compare yields - yields are the acid test of the usefulness of new practices. Changes in color, size, etc., of plants are not necessarily associated with increased crop yields.

2. Compare 2,4-D-trace-mineral-treated plots with plots treated with 2,4-D or trace minerals alone - not with completely untreated plots whose yield, standability, maturity, etc., are affected by severe weed encroachment or minor nutrient deficiencies. This is the test that determines whether the combination is important.

3. Consider the economics of the situation. Ask, "Is this the best and least expensive (including cost of materials and application) way of achieving a given result?"

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 19, 1956

PUBLICATIONS OF UNIVERSITY OF ILLINOIS
AGRONOMY DEPARTMENT

No. 4

The following list contains some of the most popular Agronomy Department publications of the past few years and also some more recent releases with which you may not be familiar. We present them as a guide to you in obtaining up-to-date information from your Agronomy Department. Order by number (B - bulletin; C - circular; or AG - Agronomy mimeograph) and/or title.

Corn

- B597 Experimental Corn Hybrids, 1955 Tests. 32 p. Of interest to seed producers. These hybrids are not in commercial use.
B598 1955 Illinois Corn Tests. 32 p. Of interest to all Illinois corn growers.
AG1645 Recipe for 100-Bushel Corn

Small Grains and Oil Crops

- B485 Spring Barley in Illinois. 12 p.
B556 Soil-Borne Wheat Mosaic. 35 p.
C726 Crops for Emergency Plantings. 8 p.
C754 Spring Oat Varieties for Illinois. 16 p.
AG1019 Flaxseed Production in Illinois
AG1617 Winter Oats - a Crop for Southern Illinois
AG1639 Oat and Wheat Seed Treatments
AG1662 1955 Winter Barley Variety Trials
AG1663a-c 1955 Winter Wheat Variety Trials
AG1667 1955 Winter Oat Yield Data
AG1666a-c 1955 Spring Oat Variety Trials
AG1673 Oat Variety Demonstrations - Illinois - 1955
AG1683 Illinois Wheat Variety Demonstrations - 1955

Legumes and Grasses

- B569 The Clark Soybean for Illinois. 4 p.
C559 Sweet Clover for Illinois. 24 p.
C647 Pastures for Illinois. 64 p.
C649 Better Farming With a Legume-Grass Program. 12 p.
C650 Ladino Clover in Illinois. 12 p.
C676 Soybean Diseases in Illinois. 32 p.
C682 Long-Season Pastures for Illinois. 8 p.
C703 Five Steps in Pasture Improvement. 16 p.
C725 Growing Birdsfoot Trefoil in Illinois. 16 p.
C727 Growing Red Clover in Illinois. 8 p.
C740 Keeping Southern Illinois Pastures Productive. 12 p.
C743 How to Make Good Grass-Legume Silage. 16 p.
AG1623 Sudan Grass
AG1682 1955 Soybean Production Survey in Illinois
Illinois Soybean Variety Demonstrations - 1955

Weed Control

- C572 Wild Onion and Garlic. How to Control. 8 p.
C718 Weeds of the North Central States. 239 p. (Charge)
C742 Chemical Control of Weeds and Brush. 12 p.

(Continued)

Soils

- B539 Soil Building With Legumes. 16 p. Describes results from Illinois soil experiment fields.
B540 Costs and Benefits From Soil Conservation in Northeastern Illinois. 36 p.
B550 How Valuable Are the Soils of Central Illinois? 36 p. Shows relative values based on farm earnings
B577 Yield and Composition of Corn Forage as Influenced by Soil Fertilization. 20 p.
B587 Field Descriptions and Analytical Data of Certain Loess-Derived Gray-Brown Podzolic Soils in the Upper Mississippi Valley. 80 p. (Charge)
C575 How to Farm on the Contour. 6 p.
C593 Grass or Gullies. 20 p. Tells how to build and maintain grass waterways
C595 Manure Is Worth Money. 8 p.
C604 Shall We Fall-Plow or Spring-Plow in Northeastern Illinois? 8 p.
C644 The Story of a Lake. 16 p. A convincing demonstration of the need for soil-saving practices.
C655 Tilt of Corn-Belt Soils Cannot Be Maintained Without Legumes and Grasses. 8 p.
C663 Handling Northeastern Illinois Soils. 16 p.
C667 Protecting Your Soil. 24 p. A brief guide to sound conservation practices
C721 Limestone--How to Use It, When to Use It, Where to Use It. 12 p.
C724 Soil Treatment Recommendations Based on Soil Tests. 4 p.
C734 Plain Talk About Soil Management. 16 p.
AG948 The Morrow Plots
AG1443 Illinois Soil-Type Descriptions. 293 p. (Charge)
AG1481 Nitrogen for Illinois Corn
Your Soil Testing Story. 16 p.
AG1562M What's in the Fertilizer Bag
AG1571 Nitrogen Fertilizers - What They Are and How They Act
AG1578 Effect of Cropping Systems on Corn Yields and on Physical Properties of Some Dark-Colored Soils
AG1654 Fertilizers, Fertilizer Materials, and Rock Phosphate Sold in Illinois July 1, 1954, to December 31, 1954. Released every 6 months
AG1588 Nitrogen Recommendations
AG1656 Illinois Soil-Testing Data by Counties
AG1670 Fertilizer, Fertilizer Materials, and Rock Phosphate Sold in Illinois January 1, 1955, to June 30, 1955
AG1674 The Status of Minor Elements in Illinois Soils
AG1677 Laboratory Results on Soil Samples Submitted From Illinois for North-Central Regional Nitrogen Study
AG1686 Lessons From the Morrow Plots - 1955
Annual summaries of soil experiment fields (request by name of experiment field)

General

- Crop Varieties for Illinois (chart 32" x 21").
Agronomy Facts, Vol. 1 and Vol. 2 (Charge). Compilation of brief articles on pertinent agronomic topics
AG1642 Graduate Study in Agronomy. Brochure for prospective students

For topics not covered here or for more specific information, write to the University of Illinois College of Agriculture, Urbana, Illinois. Also watch the Agronomy News for the latest publications of your Agronomy Department and, if possible, tune in to WILL, the University of Illinois Station, for Agronomy topics to be heard Monday of each week from 12:15 to 1:00 p.m. on the Illinois Farm Hour.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 2, 1956

DEEP TILLAGE IN ILLINOIS

No. 6

Your Agronomy Department at the University of Illinois is testing two methods of deep tillage, namely, deep plowing (using large moldboard or disc plows) and chiseling (using heavy chisel-toothed implements to break through the subsoil).

Deep plowing

An experiment at the Brownstown Experiment Field comparing deep plowing (18") with ordinary plowing (9") has produced the following results so far:

Crop	1954		1955 (same plots)	
	Deep plowing bu./A.	Ordinary plowing bu./A.	Deep plowing bu./A.	Ordinary plowing bu./A.
Corn	49	49	55	57
Soybeans	21	21	23	24
Wheat	43	39	50	49

Deep plowing was done only in 1954; 1955 yields indicate the residual effects of this treatment. Twelve tons of limestone and ample potash and phosphate were plowed under at the beginning of the test. The table indicates no yield advantage for deep plowing. Yields were not decreased, however. This result might have been expected because of mixing of the very infertile subsoil (characteristic of the Cisne soil type on which this experiment was performed) with the topsoil, where most plant root feeding is carried on. Apparently the heavy fertilizer applications counteracted this effect.

Further work along these lines may tell us whether, over a period of years with further fertility and deep plowing treatment, a soil type with certain undesirable characteristics can actually be changed to supply a more favorable environment for plant growth. This work is being carried on at present by P. E. Johnson, extension agronomist of the southern Illinois area, and other U. of I. agronomists.

Chiseling

Research at Illinois and at nearby agricultural experiment stations has so far shown no practical benefits from subsoil chiseling (see SM-11, Agronomy Facts, Volume I, available from the University of Illinois College of Agriculture at a nominal price). Because of some favorable reports and claims from individuals throughout the state, the Agronomy Department is expanding its research program on chiseling to try to find out under which conditions, if any, this practice is economically feasible for the farmer. In 1954 Dr. C. A. Van Doren, Dr. R. S. Stauffer, and others began new field tests on chiseling. The 1955 crop yields showed that an increase in corn yields due to chiseling occurred in only

one of eight northeastern Illinois tests. The over-all results are shown in the following table:

Yields of Corn as Affected by Chiseling
(Kankakee County - 1955)

<u>Characteristics of area</u>	<u>Check</u> <u>bu./A.</u>	<u>10"</u> <u>bu./A.</u>	<u>18"</u> <u>bu./A.</u>
1. Low-lying, nearly level soils; soil types - Ashkum and Drummer silty clay loams (average of 4 experiments)	75.2	78.5	78.2
2. Sloping, coarser textured soils; soil types - Elliot, Martintin, and Symerton silt loam (average of 4 experiments)	73.5	75.4	82.3
Over-all average	74.4	77.0	80.5

The differences shown in the table were not statistically significant. It appears, however, that greater yield responses were obtained on the sloping, coarser textured soils than on the nearly level, finer textured soils.

The tests are to be continued for three years at the same locations, and new tests will be initiated in order to cover as wide a range of soil and climatic conditions as possible.

On the basis of present information, the costs involved, and the likelihood that no benefits will be obtained, chiseling is not now recommended.

Items of Interest:

Dr. R. S. Stauffer, professor of soil conservation, is a member of the North Central Regional Deep Tillage and Deep Fertilization Committee. The committee is comprised of agronomists and agricultural engineers of Illinois and 12 neighboring states who are attempting to coordinate deep-tillage research in this region to bring to light the true aspects of this rather controversial issue.

Dr. Sam R. Aldrich, extension agronomist from Cornell University, Ithaca, New York, will be working with the U. of I. Agronomy Department for six months beginning March 1. He will work particularly in connection with minimum-tillage demonstrations in this state, primarily on corn, but perhaps also on soybeans.

An elaborate series of experiments dealing with deep tillage and deep fertilization will be in progress at the recently developed Southern Illinois University Experiment Field this year. Depths of tillage and fertilizer placement ranging from 9 to 36 inches will be compared in these tests.

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AGRONOMY

CROPS AND SOILS

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COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 9, 1956

TIPS ON BUYING FERTILIZER

No. 7

A guaranteed analysis showing the percentage (pounds per 100 pounds) of any available nutrient (N = nitrogen, P_2O_5 = phosphate, K_2O = potash) in a fertilizer must be given on the bag or by the seller. (The only common exception is rock or colloidal phosphate, for which a value for total P_2O_5 is usually given, although available P_2O_5 may also be listed, e.g., 33% total P_2O_5 , 3% available. Liquid 10-10-10, which may be sold by the gallon, contains 10 pounds of each nutrient per 100 pounds, and not per gallon. Dealers should be willing to quote a price per 100 pounds as well as per gallon.

If you plan to use mixed fertilizers (solid or liquid) or blended fertilizers, select a ratio of nutrients that best fits the needs of your soil as indicated by soil tests. In some cases (especially where large amounts of N and small amounts of P_2O_5 and K_2O are needed), blended fertilizers have an advantage because they provide a greater variety of combinations. Small differences in analysis, such as 8-16-16 versus 8-16-14 are not important so far as the immediate crop response is concerned. These two should not be compared on a cost-per-100-pounds basis, however, since they do not supply the same quantity of nutrients per 100 pounds.

You can build up soil fertility by using single carriers, mixed fertilizers, liquids, or any other kind of fertilizer provided you add them in large enough quantities to supply the nutrient needs indicated by soil tests. The best fertilizer or fertilizers to use are those that provide the desired quantity of available nutrients at the lowest cost per acre applied.

If you wish to apply P_2O_5 and K_2O on a maintenance basis on "built-up" soils, consult plant removal tables to determine the best ratios and amounts of nutrients to apply.

Large quantities of fertilizers are now being sold in 80-pound bags. A price quoted per 100 pounds, however, is much simpler to convert to a cost-per-acre basis.

Your Agronomy Department suggests the following procedure for selecting fertilizers:

1. Determine the nutrient needs of the soil in question by soil tests and consultation with farm advisers or extension specialists.
2. Decide how much of each nutrient (N, P_2O_5 , and K_2O) you wish to apply per acre.
3. Select the fertilizer or combination of fertilizers that supplies these amounts at the lowest cost per acre applied. (You will need to contact several dealers to get prices and other information. The following table should be helpful in comparing these costs.)

(Continued)

Field (number or description)

[illegible]

Cost per acre if single carriers are used (including application cost)	
Cost per acre if mixed fertilizers are used (including application cost).	
Cost per acre if a combination of mixed and single carriers is used (including application cost)	
Select several combinations. . . {	

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AGRONOMY

CROPS AND SOILS

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COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 16, 1956

CORN CULTURE IN ILLINOIS

No. 8

Variety selection:

Bulletin 598, 1955 Illinois Corn Tests (obtain from College of Agriculture, Urbana, Illinois), which deals with corn variety performance, seed treatment, and diseases, may be helpful in selecting hybrids for use in particular areas. Also, farm advisers often have information on varieties that have been most successful in their counties. Farmers may wish to get more than one variety from each of several sources and make their own comparisons of yield, quality, standability, maturity, ease of picking, etc., at harvest time. Fair comparisons of this type may be made by growing different varieties on uniform soil areas and using uniform cultural and harvesting practices.

Seedbed preparation:

The "plow-plant" and other minimum tillage methods of planting corn have been tested and found satisfactory in other states, including Michigan and New York. Dr. Samuel R. Aldrich, who has had a considerable amount of experience with the practice in New York, is now working with the U. of I. Agronomy and Agricultural Engineering Departments in establishing extensive minimum tillage tests in Illinois. Several variations of the minimum tillage idea will be tested, including "plow-planting" with planting units mounted on the plow, planting with conventional planters immediately after plowing, and planting directly in fall-plowed land without further tillage (using chemicals for weed control).

In other states, similar methods have reduced labor and equipment costs, kept the soil in good physical condition, cut down trouble with annual weeds, and increased water absorption. Yields, instead of being reduced, are often increased. Although the Agronomy Department can not yet specify where minimum tillage planting will be practical, it does recommend keeping extra tillage to a minimum and paying less attention to the preparation of very fine seedbeds, which are not necessary for corn.

To control corn borer effectively, corn land should be plowed carefully before May 10 in order to cover trash harboring borers.

Planting time:

Corn should be planted from May 15 to 25 in central and northern Illinois. Earlier planting builds up corn borer numbers. Planting after June 1 especially is not desirable, because it may increase the number of late-season borers that will live through the winter to cause trouble next year. U. of I. tests have shown sharp yield reductions in corn planted after June 1, even when borers were not serious. In southern Illinois early planting may not be harmful because corn borer numbers are relatively low in most of this area.

Planting rate:

Planting rates aiming at 12,000 to 16,000 plants per acre are recommended. The lower rates should be used on soils of lower fertility (65-bushel corn yields) and the higher rates on highly productive soils (above 90-bushel yields). Populations lower than 12,000 do not take full advantage of available nutrients, water, and light. Higher populations (15,000 - 16,000 or above), when grown on low to moderately fertile soils, invite lodging and picking difficulties (ears too small) that may cause a high percentage of the corn to be left in the field.

Weed control:

To control weeds in corn effectively requires that sound cultural practices be used over the entire farm (and preferably in the entire community). Such practices include buying clean seed, cleaning harvesting equipment to avoid spreading weed seed, clipping or grazing to prevent weed seed production, cross cultivating if possible, and sometimes hand hoeing, cutting, or pulling.

Corn cultivations, while important, should be few and shallow. Tests have shown that frequent deep (3"-4") cultivation reduces corn yields by pruning the roots, destroying soil structure, and in other ways. Often the only valid reason for cultivating is to control weeds. Other benefits, such as soil aeration and crust breaking, are generally over-rated.

Chemicals may be used, if needed, to supplement these practices. Dinitro and 2,4-D ester are recommended for pre-emergence (immediately before planting) application. Pre-emergence herbicides should, however, be used with caution and only by persons who are familiar with their use. Rotary hoeing and 2,4-D applications will help to control weeds emerging with the corn; 2,4-D is also effective against broadleaved weeds in taller corn. (For methods and rates of chemical applications, read container labels carefully. Consult farm advisers and see C742, Chemical Control of Weeds and Brush. Watch further issues of Agronomy News for reports on promising new herbicides.)

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URBANA

April 23, 1956

LIQUID FERTILIZERS

No. 9

The first liquid fertilizers to be marketed in Illinois were the nitrogen solution materials.

Solution 32 is a nonpressure liquid consisting of a 50-50 mixture of ammonium nitrate and urea and containing 32 percent of nitrogen. This solution carries 24 percent (7.68 lb. per 100) of its total nitrogen in the leachable nitrate form. Solution 32 can be sprayed or dribbled on soil surfaces with no danger of volatile nitrogen losses. This solution is very corrosive to brass, but not to aluminum or stainless steel. It salts out at 32° F.

Solution 37 is a low-pressure solution containing 37 percent of nitrogen. It consists of a mixture of ammonium nitrate and dissolved ammonia. Thirty-two percent (11.84 lb. per 100) of the total nitrogen in Solution 37 is carried in the leachable nitrate form. Because of the presence of free ammonia, Solution 37 should be injected into the soil or covered with soil immediately to avoid serious loss of nitrogen by volatilization. Coverage or injection to a depth of several inches is necessary. The corrosion problems with Solution 37 are similar to those for Solution 32. Solution 37 salts out at 48° F., a somewhat higher temperature than that for Solution 32.

Aqua ammonia is a nonpressure nitrogen solution containing about 20 percent of nitrogen. Serious volatilization losses of nitrogen can occur if the ammonia is applied to the surface. Studies reported by Hawaiian workers indicate that 8 percent of the ammonia volatilizes if it is applied directly on the surface of moist soils, whereas losses of 19 percent occur when it is applied on residues. It is apparent from these results that aqua ammonia must be injected into the soil. Usually injection to a depth of two to three inches is ample.

A more recent development in Illinois is the introduction of liquid mixed fertilizers. These are nonpressure, nonvolatile fertilizers containing two or more plant foods.

Liquid mixed fertilizers have been made possible as a result of the supply of electric furnace phosphoric acid. A comparison of the materials commonly used in the manufacture of liquid and dry mixed fertilizers follows:

Liquid Mixed Fertilizers

Nitrogen (N)

Anhydrous ammonia
Ammonium nitrate
Urea

Phosphorus (P₂O₅)

Phosphoric Acid

Potassium K₂O

Muriate of potash

Solid Mixed Fertilizers

Nitrogen (N)

Anhydrous ammonia
Ammonium nitrate
Urea
Ammonium sulfate

Phosphorus (P₂O₅)

Superphosphate

Potassium (K₂O)

Muriate of potash

The primary difference between liquid and solid mixed fertilizers, other than their physical state, is the manner in which the phosphorus is supplied.

Phosphoric acid is highly corrosive. Anhydrous ammonia is therefore used to neutralize the phosphoric acid and thus neutralize the product. All liquid mixed fertilizers will therefore carry some nitrogen in contrast with dry mixes, which can be produced to carry no nitrogen (e.g., 0-20-20 or 0-9-27).

A wide variety of NP or NPK ratios is possible with liquids. In general, however, water solubility imposes limits on the total plant food content. The sum of the NPK percentages in liquid mixed fertilizers cannot generally exceed 32 percent without salting out of materials at temperatures slightly below 32° F.

There is very little field information to compare results of applying liquid and solid fertilizers of similar analysis at equivalent rates. Missouri results on small grains show essentially similar responses. Michigan results with certain vegetable crops indicate slightly better increases for dry fertilizers than for liquid. The differences, however, are slight and perhaps not significant. Until more information is available, all that can be said is that liquid fertilizers are as good as dry mixes. Whether they are superior remains to be learned.

Liquid fertilizers can be applied in the row or sprayed or dribbled on the surface to simulate broadcasting. Corrosion can be a serious problem unless sprayers are equipped with aluminum or stainless steel tanks and stainless steel jets or nozzles.

Liquid fertilizers are "hot" and will usually kill plant leaves on contact. They should therefore be applied to the soil before corn is planted or in such a way as to avoid leaf contact. Applications on wheat and meadows should preferably be made before spring growth occurs.

Liquid fertilizers usually are and should be sold on a weight basis. As is also true of dry mixes, their composition is expressed in percentages. Some persons think that a gallon of 10-20-10 contains 40 pounds of total plant food. If this were true, such an analysis would weigh more than 40 pounds per gallon. Actually most liquid fertilizers weigh 10 to 12 pounds per gallon. If 10-20-10 weighs 12 pounds per gallon, the actual plant food content is 1.2 pounds of nitrogen (N), 2.4 pounds of phosphorus (P₂O₅) and 1.2 pounds of potassium (K₂O) per gallon. The retail value of these plant foods should not exceed 50 cents a gallon. One can not successfully substitute a few gallons of 10-20-10, or any other liquid fertilizer, per acre for an adequate application based on experiment station or soil test recommendations for field crops, irrespective of method of application (leaf feeding or row applications).

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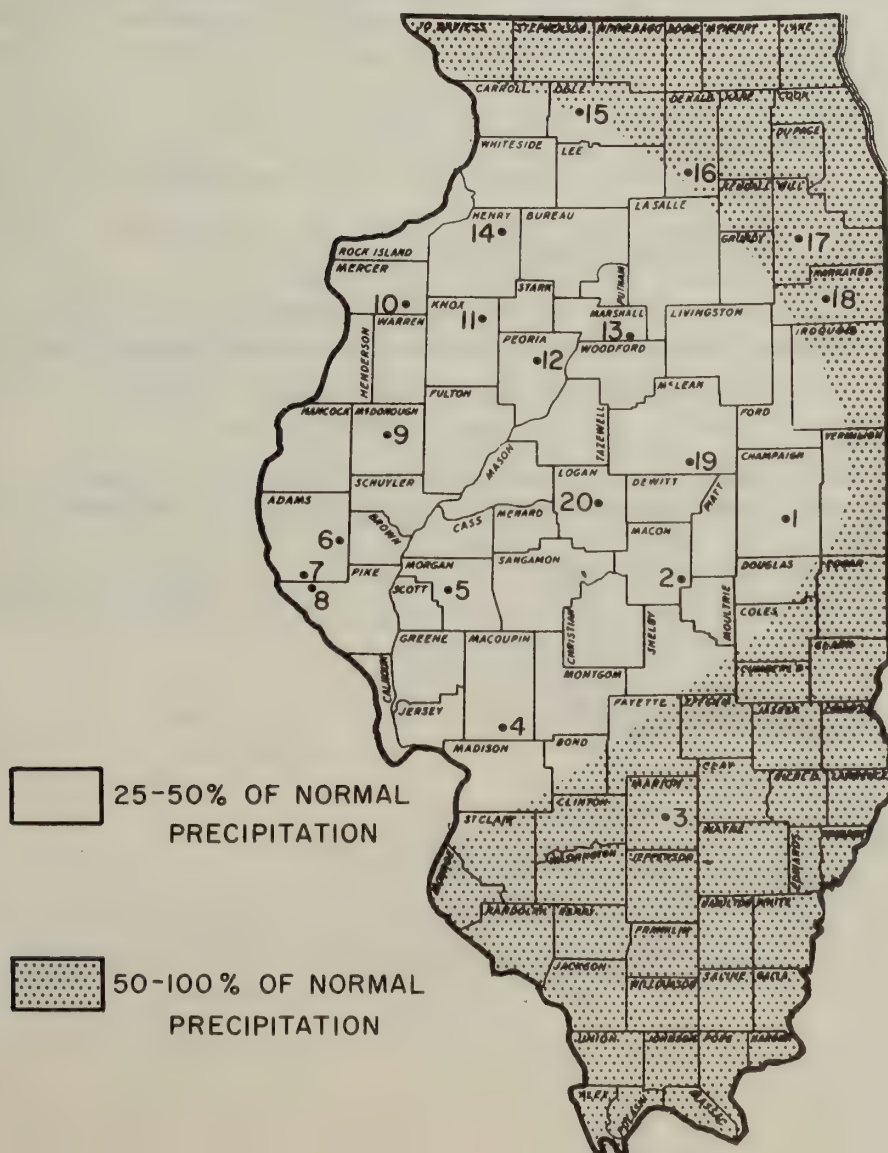
URBANA

April 27, 1956

No. 10

THE SOIL MOISTURE SITUATION IN ILLINOIS

The following map, showing percentages of normal precipitation received in Illinois from October 10, 1955, to April 1, 1956, was prepared through the cooperation of the U. S. Weather Bureau and the Illinois State Climatologist. Dots and numbers represent locations where soil moisture profiles were taken on April 20 and 21 by the University of Illinois Agronomy Department and the Soil Conservation Service.



Results of Soil Moisture Samplings

Location of sample	Soil type	Inches of available water in upper 5 feet of soil	
		In normal seasons	At this sampling
1	Flanagan	11.8	9.1
2	"	11.8	11.3
3	Cisne	11.6	12.4
4	Cowden	11.7	10.1
5	Ipava	12.5	10.5
6	Herrick	11.6	9.4
7	Clary	10.8	3.3
8	Herrick	11.6	5.9
9	Ipava	12.5	8.2
11	Muscatine	13.7	8.8
12	Tama	10.6	6.1
13	Muscatine	13.9	10.0
14	Fayette	10.8	7.2
15	Tama	10.6	4.9
16	Saybrook	8.3	6.7
17	Elliott	10.7	4.9
19	Flanagan	11.8	10.5
20	Ipava	12.5	9.2

Subsoil moisture is most deficient on sloping soils. If tile drains are running, the soil is undoubtedly recharged to capacity. If drains aren't discharging, it would be well to examine the subsoil moisture in your fields to a depth of 4 or 5 feet.

Keep these points in mind:

1. Further subsoil recharge is very improbable before next fall.
2. Full-season crops all depend to a considerable degree on subsoil moisture, particularly during July and August.
3. Conserve summer rainfall by contouring on sloping land, good weed control, and "rough tillage" for good infiltration and moderation in planting rates.
4. Sudan grass and forage sorghums may be useful in meeting midsummer feed needs and as material for silage purposes. See Cir. 726.

A more complete discussion of the subsoil moisture situation will be given in the next issue of Agronomy News, scheduled for release May 1.

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URBANA

May 1, 1956

ADJUSTING CROP PRODUCTION PRACTICES
TO SOIL MOISTURE SHORTAGE

No. 11

The last issue of Agronomy News presented a disturbing picture of the soil moisture situation in the northern two-thirds of Illinois. Lower than normal winter precipitation has caused a decrease in the amount of moisture stored in the upper five feet of many of our soils. With this point in mind, let us consider crop prospects for the coming season.

Experiments have shown that crops, particularly corn, draw water from deeper and deeper down in the soil as the season progresses. In the dry part of the summer, the plants become dependent on subsoil moisture at depths of three to six feet. Usually moisture in this region is depleted during the growing season and is recharged in the late fall, winter, and early spring. In many parts of Illinois soils have had little recharge this year.

It will be a rare season indeed if we do not get enough moisture in the next few weeks to at least give our crops a start. A critical period may occur, however, in midsummer, when rainfall normally slacks off and crops begin to draw heavily on water stored in the subsoil.

Above-normal rainfall, well distributed throughout the summer, could overcome the present water deficiency and bring good crop yields. Counting on that to happen however, would take more optimism than most of us have. Also, extra runoff and evaporation losses make an inch of summer rainfall less effective in promoting crop growth than an inch of water stored in the subsoil.

The following recommendations are for those who would like to reduce the risk of lower yields or other crop damage due to water shortage. They are based on the assumption that crops grown this year in the northern two-thirds of Illinois will have to depend to a great extent for their water supply on rain falling during the growing season instead of on stored subsoil moisture. Therefore, in planning their crop production practices this year, farmers should consider these four objectives: (1) to keep rain water on fields and give it time to soak in, (2) to make the most efficient use of any water that is in the soil, (3) to avoid overloading the water supply by excessive planting rates, too heavy starter fertilizer applications, etc., and (4) to use to the fullest extent crops that are able to resist drouth.

Recommendations

1. To reduce runoff, work and plant sloping land on the contour. The soil moisture shortage is much more critical on slopes than on most level land. Plant the crops you wish to favor on bottomlands or level uplands.

2. Leave seedbed surfaces rough so that rain will soak in rapidly. Overworking does not necessarily reduce evaporation, and it definitely slows water infiltration when hard rains come. For the same reason, avoid frequent or deep cultivation of row crops.
3. Plant when the soil is moist. Plant deeper than normally, if necessary, to reach moist soil. Plant at a uniform depth to insure uniform germination and emergence. Spread your risk by varying maturity through the use of different corn hybrids and/or different planting dates.
4. Cut planting rates by 20 to 25 percent. For example, if you normally aim for 16,000 corn plants per acre, try for 12,000 this season. Uniform spacing and equal numbers of kernels per hill or per foot of row are necessary to make as complete use of available water as possible.
5. Cut nitrogen applications in proportion to reductions in planting rate. Side-dressing will permit adjustment of nitrogen applications to the amount of May and June rain. If you use a starter fertilizer, apply at a moderate rate, especially on drouthy soils. Don't let seed come into contact with banded or hill-dropped fertilizer.
6. Control weeds. Every weed that you leave alive will take valuable moisture from neighboring crop plants.
7. Save old grass-legume seedings that are still productive, even though prospects for a full crop are not good. New seedings may fail this year. Be prepared for crop failures with a knowledge of useful emergency crops (consult farm advisers and see C726, "Crops for Emergency Plantings").

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May 7, 1956 RAISING SOYBEANS IN ILLINOIS - A STEP-BY-STEP METHOD

No. 12

Select a good variety. The following soybean varieties are recommended for Illinois on the basis of high yield, high oil content, and resistance to lodging, shattering, and diseases:

Northern Illinois: Blackhawk, Harosoy, Hawkeye (arranged from earliest to latest).

North-Central Illinois: Harosoy, Hawkeye, Adams, Lincoln.

South-Central Illinois: Harosoy, Hawkeye; Adams, Lincoln, Clark.

Southern Illinois: Adams, Lincoln, Clark, Wabash, Perry.

If possible, do not plant successive crops of beans on the same field. Separating soybeans in the rotation by three or more years of other crops reduces the possibility of lower yields due to such soybean diseases as brown-stem rot, brown spot, and pod and stem blight.

Plow and prepare the seedbed early. Early seedbed preparation allows weed seeds to germinate as soon as possible. From one to three crops of weeds can be destroyed by shallow cultivation before soybeans are planted.

Delay planting until soils are warm. Soybeans are more sensitive than corn to cool soils. When planted in warm soils they will emerge quickly--usually before the weeds. In general, the latter half of May is the best time to plant soybeans.

Inoculate the seed with a suitable strain of nitrogen-fixing bacteria. Inoculation is especially important in areas where soybeans have not been grown in recent years, but it is cheap insurance any time. Soybean strains of bacteria are usually sold with humus as a carrier. To get uniform distribution, always apply humus cultures with water. Too little water causes poor coverage; too much causes the seeds to swell, making planting difficult. A mixture of humus and one-half pint of water per bushel of beans (a little less with large seeds) is recommended. Treat the seed preferably within one hour, and at least within 1/2 day, of planting, and do not expose it to sunlight after treatment. Treating soybean seed with fungicides is not generally recommended for Illinois.

Plant 8 to 12 good, germinable seeds per foot of row. Fifty to 70 pounds of seed per acre will be ample to get this spacing. Heavier rates increase lodging.

(Continued)

Plant in rows that can be cultivated with conventional cultivation equipment. Illinois tests on hand-weeded plots showed that yield was reduced 2 to 4 bushels an acre when planting was changed from 20-inch rows to 40-inch rows. The fact that wider rows are easier to cultivate, however, more than makes up for this reduction. Shortening the gauge or marker on the planter so that every second or fourth row space is narrower will overcome the yield reduction to some extent. Row seedings (20 to 40 inches) far outyield broadcast seedings or eight-inch rows (17.4% in our tests).

Control weeds with sound cultural practices. More than any other factors, weeds and adverse weather reduce soybean yields. Little can be done about the weather, but weeds can be controlled in various ways. Rapid rotary hoeing is useful in breaking the crust and controlling small weeds just before and after the beans emerge. Conventional cultivation equipment is generally used when beans are over six inches high. Cultivating is usually not beneficial except when there are weeds to control. Tall, late-season weeds and corn may have to be removed by hand hoeing.

Use chemical weed control only if weeds cannot be controlled by cultural practices. Controlling weeds in soybeans by using chemicals requires just the right combination of soil and weather conditions and accurate application procedures. Since no two seasons are alike, results have been highly variable and not very conclusive. Pre-emergence band applications of dinitro or Chloro IPC on heavier soil types (not sandy soils) have shown promise, but they are not recommended for general use. Likewise, some annual broadleaved weeds (cocklebur, annual morning glory, pigweed, and ragweed) can be controlled by applying 1/8 pound of 2,4-D acid in the amine form to beans three to five inches tall--a practice that is especially useful in some bottomland areas. Extreme caution is necessary, however, since applications at even slightly higher rates to beans taller than five inches may reduce yields.

Until farmers and research men have more experience with the practice, the Agronomy Department recommends trial use of chemicals to control weeds on small areas of soybeans.

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URBANA

May 14, 1956

No. 13

SUDANGRASS--A USEFUL TEMPORARY OR EMERGENCY FORAGE CROP FOR ILLINOIS

The soil moisture shortage that exists in parts of Illinois this year may result in a need for emergency crops to replace seedings that fail and to supplement permanent or rotation pasture, silage, and hay fields. Sudangrass, an annual, vigorous, tall-growing plant related to the forage and grain sorghums, is one of the best supplementary or emergency crops. The following facts have shown up in the extensive Sudangrass variety and management experiments carried out by the University of Illinois Agronomy Department.

The varieties Piper and Sweet perform best in Illinois. Lahoma also has yielded well in the southern part of the state, but it needs further evaluation. Piper, a variety developed in Wisconsin, possesses a low prussic acid precursor content. (Prussic acid precursor is a substance that changes to prussic acid in the digestive tract of animals. Under certain conditions, Sudangrass plants contain enough of this substance to cause the poisoning and death of grazing animals. Ways of preventing this effect will be mentioned later.) Piper has produced more hay, silage, and pasture than other varieties in Illinois tests. It is resistant to leaf diseases, which sometimes seriously reduce Sudangrass yields.

Sweet was developed in Texas from a cross between common Sudangrass and Leoti sorghum. This variety suffered a considerable amount of damage from disease in some of last year's tests. Some livestock producers feel that Sweet is more palatable for grazing than Piper. Piper may make up for this lack, however, in the extra tonnage it produces. Also, since Piper grows very rapidly, its palatability is often reduced by too much delay in grazing or harvesting.

Lahoma is a shorter, later maturing variety than Piper or Sweet. It is damaged moderately by leaf diseases.

Certified seed gives the best results. Sudangrass crosses freely with other sorghums. Some of these have a higher prussic acid precursor content than Sudangrass. Seed contaminated in this way may produce pastures that are more dangerous to livestock than if pure certified seed were used. Treating the seed with Ceresan M or Panogen is recommended to inhibit seedling diseases.

Sudangrass is a warm-weather crop and should not be planted before late May or early June. In central and southern Illinois, it can be planted as late as August 1.

(Continued)

Twenty to 25 pounds of seed per acre drilled or broadcast on a well-prepared seedbed usually gives the best stands. Some farmers plant a mixture of Sudangrass and soybeans, in which case 1 to 1½ bushels of soybeans and 15 to 20 pounds of Sudangrass are commonly used. To lessen the possibility that the Sudangrass will crowd out the soybeans, the beans can be planted first and the Sudangrass broadcast and rotary-hoed in after the bean crop has emerged. If possible, seed should be placed 1 to 1½ inches deep.

When other nutrients are adequate, nitrogen may increase Sudangrass yields. Applications of 30 to 50 pounds of nitrogen per acre are suggested when maximum forage yields are needed and when the preceding crop was not a legume. Sometimes high applications of nitrogen, when other nutrients are low, increase the prussic acid precursor content.

Sudangrass may be used for pasture, hay, or silage. It will usually be ready for pasture four to six weeks after planting. Pasturing should, however, be delayed until the Sudangrass is at least 18 inches tall to reduce the danger of prussic acid poisoning.

The details of managing Sudangrass for pasture, hay, or silage will be discussed in a later issue of Agronomy News.

Recent publications (available from Agronomy Department, University of Illinois College of Agriculture, Urbana, Illinois):

- C756 - Alfalfa
- C760 - Five Years of Tests of Soybean Varieties for Illinois
- AG1692 - The Place of Grain Sorghums in Illinois
- AG1693a - Spring Wheat--Recommended Only for Northern Illinois
- AG1693b - Spring Barley--Recommended Only for Northern Illinois
- AG1695 - Illinois Soil Testing Data by Counties
- AG1696 - Fertilizer, Fertilizer Materials, and Rock Phosphate Sold in Illinois
- AG1698 - 1955 Results From Forage Crop Variety Trials in Illinois

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URBANA

May 21, 1956

MAKING HIGH-QUALITY HAY

No. 14

A well-fertilized field of hay, on which good cutting and curing methods are used, may, on the average, yield double the amount of digestible nutrients (feed value) per acre that a small grain would yield on the same land. Where management is poor, however, the value of the hay may not justify the cost of harvesting. Therefore, good management practices are of great importance in making hay crops a paying proposition.

The quality of field-cured hay depends on:

1. Weather conditions during the hay-making period.
2. The stage of growth at which the hay is cut.
3. Chemical changes that occur in the hay during drying.
4. Losses resulting from mechanical manipulation of the hay during harvesting.

Weather

Nobody can do much about the weather. Shrewd farmers pay close attention to local and regional weather forecasts and try to adjust their operations accordingly.

Stage of growth

Experiments have shown that the following changes take place as hay matures:

1. Yield (dry weight) increases until about the full-bloom stage.
2. Feed value per ton decreases slowly at first and more rapidly as the plant approaches maturity.

Since yield increases and feed value per ton decreases as the plants grow older, we know that a happy medium exists when the crop contains the highest total feed value per acre. This is the time the hay should be cut. It differs slightly with different hay crops, as shown in the following table:

<u>Crop</u>	<u>First cutting</u>	<u>Later cuttings</u>
Alfalfa	Early bloom	Early to full bloom
Red clover	Early to full bloom	" " " "
Alsike clover	" " " "	" " " "
Sweet clover	Bud stage	--
Lespedeza	Early bloom	Early bloom
Soybean hay	Beans half developed	--
Grasses	Early head stage	Early head stage

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Note: If insects, disease, and nutritional deficiencies should delay or prevent blooming, the calendar may have to be the guide for time of cutting. Make sure the last cutting falls at least four to six weeks before killing frosts.

If the field contains a mixture of grasses and/or legumes with different maturity dates, cut the crop at an intermediate time, leaning toward the predominant member of the mixture.

Chemical changes

Carotene is destroyed when hay is exposed to bright sunlight. Carotene, which becomes vitamin A in the animal's system, is a very important nutrient and well worth saving. Hay that is windrowed soon after cutting and allowed to dry in the windrow will contain much more carotene than hay dried in the swath. The reason is that less of the windrowed hay is exposed to the direct rays of the sun. All of the carotene is often lost when hay is swath-cured.

Mechanical losses

Mechanical manipulation of hay during harvesting often causes severe leaf shattering. Since the leaves may contain 70 percent of the protein and 90 percent of the carotene in the entire plant, it is very important to keep them as intact as possible. Raking and tedding are especially violent processes that cause a considerable amount of leaf loss, especially when hay is dry. Raking soon after mowing, however, while the hay is still "tough" (wet), causes very little shattering.

On the basis of recent tests the Agronomy Department recommends the following hay-making procedure:

1. Try to cut hay at the proper stage of growth and at a time when the short-range weather forecast is favorable.
2. Cut after the dew has evaporated.
3. Allow 2-4 hours for wilting and then rake the hay into medium-sized windrows. Many tests have shown that total drying time is not necessarily increased by windrow-curing instead of swath-curing.
4. Store the hay when it is dry. If rain falls, tip the windrows up on edge with the end of the hay rake. Hay in windrows will then probably not be damaged so much as hay lying in the swath.

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May 28, 1956

AGRONOMY EVENTS

DEPARTMENT OF AGRICULTURE No. 15

Experiment Field Meetings

<u>Date</u>	<u>Field</u>	<u>County</u>
June 4	Carbondale (SIU & U. of I. Co-op. Research Center)	Jackson
June 4	Enfield	White
June 5	Raleigh	Saline
June 11	West Salem	Edwards
June 12	Blackburn (Carlinville)	Macoupin
June 13	Carthage	Hancock
June 14	Oquawka	Henderson
June 15	Hartsburg	Logan
June 25	Minonk	Woodford
June 26	Aledo	Mercer
June 27	Kewanee	Henry
June 28	Dixon	Lee
June 29	Joliet	Will
July 6	DeKalb	DeKalb
August 24	Oblong	Crawford
August 28	Newton	Jasper
September 5	Brownstown	Fayette
September 6	Toledo	Cumberland
September 7	Lebanon	St. Clair
September 11	Clayton	Adams
September 12	Mt. Morris	Ogle
September 13	McNabb	Marshall-Putnam
September 14	Elwood	Will

(Continued)

Other Events

<u>Date</u>	<u>Event</u>	<u>Place</u>
June 6-8	Farm Advisers' Spring Conference	Dixon Springs
June 11-13	Vocational Agriculture Teachers' Conference	Urbana
June 14-15	FFA State Judging Contest	"
June 19	Annual Meeting, Illinois Crop Improvement Association	"
June 20	Annual Field Day, Illinois Seed Dealers and Illinois Crop Improvement Association	"
June 22	Chicago Farmers' Field Day	"
June 27	Open House - Conducted Tours of University Farms	"
July 26-28	Fertilizer Industry Conference	"
Aug. 13	Soybean Processors' Meeting	"
Aug. 14-16	Annual Meeting of American Soybean Association	"
Aug. 20-22	Meetings of North Central Branch of American Society of Agronomy	Purdue University
Aug. 21	State F.F.A. Livestock and Grain Judging Contest Finals	Urbana
Aug. 24	Open House - Conducted Tours of University Farms	"
Aug. 27	State 4-H Judging Contest	"
Sept. 11	Annual Field Day, Illinois Seed Producers' Association	"
Nov. 26- Jan. 17	Winter Short Course in Agriculture	"

New Publications

AG1689 Report on Recent Field Experiments With Phosphates
AG1699 Sixteen Years of Soil Improvement at the Brownstown Experiment Station
AG1529a Brownstown Soil Experiment Field, 1940-1955: General Summary of Results
AG1529e Ewing Soil Experiment Field, 1910-1955: General Summary of Results
AG1529i Toledo Soil Experiment Field, 1913-1955: General Summary of Results

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URBANA

June 4, 1956

FROST DAMAGE IN ILLINOIS

No. 16

On May 21 samples of severely damaged plants began to pour into the office of Dr. J. W. Gerdemann, plant pathologist at the University of Illinois. With these samples came questions regarding the damage. Many telephone reports of injured crops were also received. The following questions arose in the minds of both farmers and research men:

1. What crops were affected?
2. What areas were affected?
3. What caused the damage?
4. How did it come about?
5. How severe was the damage?
6. What can be done about it?

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What crops were affected?

Apparently the injury was largely limited to pasture, hay, and green manure crops, particularly sweet clover, alfalfa, and red clover. Sweet clover leaves turned brown, alfalfa turned yellow or white, and red clover became black. Row crops, such as corn and soybeans, were not hurt.

What areas were affected?

Reports came from scattered locations in most of the northern half of the state, extending from as far south as Paris, in Edgar county, to the Wisconsin line. The damage seemed to be limited to local areas in fields (especially in low spots) within this area.

What caused the damage?

Many of those reporting the damage feared that some disease had struck very suddenly. After observing the plants, however, Dr. Gerdemann diagnosed the trouble as frost injury.

How did it come about?

Many asked, "How could we have severe frost damage when none of the weather stations reported below-freezing temperatures during the previous week?" The weathermen explain, however, that temperature-recording apparatus is located

at about eye level and that there may be as much as 8 or 10 degrees difference between the temperature at this level and at the surface of the ground. The coolest air, being heavy, hugs the ground and collects in low places. Temperatures as low as 34° were reported from some parts of the state on May 16, 20, and 23. If the temperatures at the soil surface were even 5 degrees below the recorded temperatures, frost injury could have easily resulted. Also, the nights were very still and the air was relatively dry. These are both conditions that might cause wide variations in temperature between ground and eye level.

Corn, soybeans, and other row crops do not, at this time of year, cover the entire soil surface. The soil between rows, being dark colored, absorbs large amounts of the sun's heat during the day. This heat is radiated back into the air at night and tends to warm the area near the soil surface. Apparently this effect was enough to prevent frost injury to the row crops. Forage crops and the straw or other residues often associated with them cover the soil completely and allow little absorption of heat during the day.

How severe was the damage?

The damage ranged from slight injuries on scattered plants to severe injuries on entire fields. It is not likely that many plants were killed, however, since only the top growth was affected and the particular crops that were injured possess remarkable ability to recover. The yield of first cuttings is likely to be reduced in areas where severe injury occurred.

What can be done about it?

Since the plants will probably recover quickly, farmers should not worry about the frost injury. There is no cause for extreme measures, such as plowing up the injured areas, etc.

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220 MUMFORD HALL



AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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URBANA

June 11, 1956

LEAF FEEDING OR FOLIAR FERTILIZATION

No. 17

OF FIELD CROPS

Man has known for over a century that plants absorb mineral nutrients through their roots. In recent years scientists have shown that these nutrients may also be absorbed through the leaves (foliage). With this new knowledge has come the question, "How would it work to apply fertilizers to plants through their leaves, and how would this method of fertilization compare with soil application of fertilizers?"

Research on foliar fertilization has so far dealt mostly with truck and garden crops. Relatively few attempts have been made to test the usefulness of the practice on field crops. Consequently no recommendations for this method can be made at present. The following comments and ideas are based on the results of a few tests made on field crops in Illinois and neighboring states.

The mineral nutrients that often or sometimes need to be applied to soils or crops may be divided into three groups:

Group 1. Non-leachable major nutrients. Includes potash, phosphate, calcium, and magnesium.

Group 2. Non-leachable minor nutrients: Includes the so-called trace elements, copper, manganese, zinc, molybdenum, boron, and iron.

Group 3. Leachable major nutrients: Nitrogen is the only member of this group.

Note: On sandy soils, all of these nutrients are leachable; that is, they may be lost from the soil in drainage water.

Group 1 nutrients apparently are not adapted to leaf application. It is more economical to supply them to the soil infrequently and in relatively large quantities than to apply them to leaves in frequent small applications. These leaf applications must be made frequently to meet the needs of the plants, and in low concentrations to prevent burning.

Group 2 nutrients are often applied to leaves as sprays or dusts to correct minor nutrient deficiencies. The required amounts are very small. Therefore leaf burning is not a problem and frequent applications are not necessary. Minor nutrient deficiencies are very rare in Illinois. No benefits from leaf applications of minor nutrients have been shown where deficiencies did not exist. Deficiencies of boron (for alfalfa) are fairly common, but the amounts required to correct them are too large for leaf application (because of burning).

Group 3 includes only nitrogen (for most soils). Two advantages have been claimed for making leaf applications of nitrogen: (1) Such applications improve the quality of crops (this has been shown to be true for apples and tomatoes, but

(Continued)

not for corn, oats, and wheat). (2) The plant is able to pick up more nitrogen when it is applied to the leaves than when it is applied to the soil. If the second claim is true, it could be very important, because the nitrogen not picked up by the plants may be leached out and lost before next year's crops can use it. The following table shows the results of an experiment carried out by the Agronomy Department in 1951 to compare different methods of applying nitrogen to corn. Forty pounds of nitrogen per acre were added by each method.

Method of application	Date applied	Concentration of fertilizer in spray	Yield (bu./A)		
			Urea	$(\text{NH}_4)_2\text{SO}_4$	NH_4NO_3
Check	--	--	81	81	81
Side-dressed	July 2	--	102	116	114
Sprayed	July 17	1 lb./gal.	95	71	66
Sprayed	July 2 & 17	1/2 lb./gal.	104	88	92

Conclusions

1. Nitrogen fertilizers sprayed on corn plants at the rate of 40 pounds of nitrogen per acre and 1 pound per gallon of solution caused marginal burning of leaves and a reduction in yield compared with side-dressing. Urea caused the smallest amount of leaf damage and the smallest reduction in yield.
2. Two sprayings of 20 pounds of nitrogen per acre at 1/2 pound of fertilizer per gallon of solution gave higher yield than one spraying of 40 pounds of nitrogen per acre at 1 pound of fertilizer per gallon of solution.
3. Side-dressing 40 pounds of nitrogen per acre increased yields of corn more than spraying except for the two sprayings of urea, which equaled results from side-dressing.

Foliar applications of fertilizers may be of value on sandy soils, where all nutrients are leachable and where some may become insufficient (for high yields) during the season. This possibility seems to justify further study. For most Illinois conditions, however, there is no evidence to show that foliar application of nutrients to field crops is more efficient or economical than soil application. Costs, including material and application, and also convenience should be considered in deciding whether to use this method of fertilization.

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THE WHAT, WHERE, WHEN, WHY, AND HOW OF
SIDE-DRESSING CORN WITH NITROGEN

No. 18

Applying nitrogen fertilizers between corn rows (side-dressing) has become a popular practice in Illinois in recent years. Certain facts should, however, be remembered in using this method of application in order to make it as effective as possible.

What materials may be used?

Both solid and liquid nitrogen carriers are used for side-dressing. Available equipment and cost of material and application should dictate which form to use. Costs of nitrogen fertilizers should always be compared on the basis of cost per pound of actual nitrogen applied. This statement is based on tests showing that a pound of actual nitrogen is equally effective, regardless of the form in which it is applied, provided each form is applied correctly--that is, in keeping with its chemical and physical characteristics.

Where should the nitrogen be placed?

The farmer must consider the depth and the position in the row space at which to place the nitrogen. Depth is important from two standpoints:

1. If nitrogen is to be able to move to corn roots, it must be placed in moist soil. If placed in dry soil that receives very little rainfall during the summer, it will be of no value to the plants.
2. Some nitrogen carriers, particularly anhydrous ammonia and solutions containing free ammonia, must be placed six to nine inches deep in the soil to prevent evaporation losses.

Side-dressing any nitrogen fertilizer directly on the soil surface is risky because crop yields will not be increased if rainfall does not cause the nitrogen to move into the plant root zones. This practice becomes more risky as the season progresses and the likelihood of heavy rain decreases.

Excessive root damage can be prevented by side-dressing at least 10 inches from the corn row, especially when deep-running blades or shovels are used to place the nitrogen. The problem of root damage becomes more serious as the plants get taller and their root systems become more extensive.

(Continued)

When should you side-dress?

Nitrogen may be side-dressed any time from corn planting until the plants are too tall to permit passage of equipment. Delaying the application, however, may make it difficult to get the nitrogen into moist soil and may also increase the possibility of root damage.

Why should you side-dress?

Side-dressing is not necessarily superior to broadcasting and plowing-down as a method of applying nitrogen. As long as an ample amount of nitrogen is applied, personal preference, available equipment, and convenience can determine which method to use.

How should you side-dress?

Solid nitrogen carriers are usually applied with an attachment on the cultivator. Anhydrous ammonia and ammonia solutions are applied with special injection equipment. When applying either of the latter two, keep tractor speeds slow to avoid opening wide furrows and exposing the nitrogen to evaporation, or use an attachment that closes the furrows.

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July 2, 1956

MANAGING SUDANGRASS FOR PASTURE, HAY, AND SILAGE

No. 19

Sudangrass, when managed properly, makes an ideal summer supplemental pasture and forage crop, particularly in areas where soil moisture is too low to support other pasture crops. This grass, which is a sorghum, is very leafy, tillers profusely, and recovers rapidly after cutting or grazing. It may become somewhat dormant under conditions of severe drought, but it resumes growth when soil moisture levels improve.

Time to Graze

Wait until the crop is 18 to 24 inches tall to graze it. At this stage cattle will readily eat both common and sweet types, and the plants will contain about 10 to 13 percent protein. If pastured at shorter heights, Sudangrass may cause prussic acid poisoning.

Prussic acid poisoning is caused by a glucoside called Dhurrin, which may break down into hydrocyanic (prussic) acid in the digestive tract of animals. Under certain conditions, Sudangrass plants may contain enough of this substance to cause death to grazing animals. Sudangrass whose growth has been slowed down by drought or partly killed by frost may be extremely dangerous to graze, because the cattle prefer the young tender shoots, which contain the most Dhurrin.

Symptoms of poisoning are depression, paralysis, stupor, and difficult breathing. If the quantity of prussic acid is high enough, the animal may die in a matter of minutes. However, an intravenous injection of sodium thiosulfate has sometimes proved effective in relieving the effects of the poison. Danger from prussic acid poisoning may be lessened by:

1. Using only certified seed or seed that is known to be pure Sudan.
2. Letting the plants grow at least 18 inches high before grazing.
3. Not turning excessively hungry cattle onto Sudangrass pastures.
4. Not grazing frosted or drought-stunted Sudangrass forage.

Grazing Management

Rotate Sudangrass pastures and stock them heavily so that the grass will be grazed down rapidly. Then let them recover until the regrowth is 18 to 24 inches tall. Separate into several areas so that only part of the pasture is grazed while the other areas are recovering. This method permits a more uniform distribution of forage throughout the summer.

Sudangrass, when used with cool-season pasture grasses and legumes, provides excellent late summer grazing until other pastures resume growth in the early fall. Soybeans planted with the Sudangrass furnish more roughage than either crop grown alone and are ready for pasturing in the midsummer. They also add protein and may help to reduce chinch bug damage to the Sudangrass, which is very susceptible to chinch bugs. No variety is completely resistant, but the sweet varieties seem to be more tolerant than the common varieties. Chemical sprays may be employed where there is a chinch bug infestation.

Hay and Silage

Sudangrass can be harvested for hay, but it is difficult to cure. The best quality hay is obtained if it is cut and properly cured when the first heads begin to appear.

When properly stored, Sudangrass makes good quality silage. Yield for silage is best when the crop is in the heading to soft dough stage. For use as hay or silage, harvest before the leaves dry.

Some agronomy publications on the subject are:

AG1623 - Sudangrass

C726 - Crops for Emergency Plantings

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PLANT TISSUE TESTS

No. 20

In recent years, soils research men in the Department of Agronomy at the University of Illinois and other institutions have developed chemical tests that can be used on fresh plant tissue to determine whether certain nutrients are adequate for good plant growth. Research workers have given the tests a thorough trial, and commercial companies are now producing tissue test kits for use by farmers and other interested people.

These tests are easy to make and are reasonably reliable. Nitrogen, phosphate, and potash can be tested by this method. Our purpose here is to give some suggestions for tissue testing under farm conditions.

Testing for Phosphorus and Potash

It is possible to build up the available forms of phosphorus and potash in soils to a high level and maintain them at that level by applying fertilizer periodically to replace what crops remove. These nutrients are not usually subject to leaching (washing out in drainage water), and the amounts in the soil do not fluctuate much during the year. Consequently a soil test will give a fairly accurate estimate of how much phosphate and potash a soil contains and how much will be needed for the coming season or perhaps for several years.

The tissue tests for phosphate and potash may be of practical value to farmers for two reasons:

1. To show a deficiency of phosphorus or potash and make it possible to evaluate the fertilizer program.
2. To distinguish between nutritional deficiency symptoms and disease or insect injury.

Tissue tests are not intended to determine the amount of a fertilizer to add to a soil.

Testing for Nitrogen

Nitrogen is a different story. The University of Illinois Agronomy Department has not found soil tests for nitrogen to be sufficiently accurate or helpful to justify their use on a wide scale. One reason is that the levels of available

(Continued)

nitrogen in the soil fluctuate widely during the growing season. Once crops begin to form, they may remove nitrogen from the soil as rapidly as it is liberated by soil organisms. Consequently, a soil test might show a very low available nitrogen level even though the crop was receiving ample nitrogen. Temperature, rainfall, and other factors also contribute to this variability in soil nitrogen levels.

To really know whether a plant is getting ample nitrogen, one must test the plant tissue itself. The tissue tests should be made throughout the growing season to detect any changes that might have taken place. For most of Illinois the best time to use the nitrogen tissue test on corn is from the middle of June to the end of August.

Making the Tests

Specific information on how to make tissue tests can be obtained from farm advisers and from manufacturers and sellers of tissue test kits. Some Agronomy Department publications on the subject are:

AG1257 - Directions for using nitrate powder on corn plants.

AG1342 - Nitrate tests for soils and plant tissues.

AG1403 - Tissue testing - Directions for running tests on chopped material.

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USE OF MANURE AS A FERTILIZER FOR FIELD CROPS

No. 21

It is worth while to preserve the nutrient value of manure and to apply it to crops when and where it will do the most good. University of Illinois Circular 595 gives suggestions for preserving the fertilizing value of manure while it is in the barn or feedlot. We shall therefore discuss only when and where manure should be applied to crops to give the most benefit.

Nutrients in manure

Manure contains the three major plant nutrients, nitrogen, phosphate, and potash. After the manure has been applied, there is little danger that phosphate or potash will be lost because these nutrients are not leachable (except in sandy soils); that is, they are not washed out in drainage water, and they do not evaporate. Nitrogen, however, may be leached or may, under some conditions, volatilize, or evaporate, and be lost into the air. Application methods should therefore be aimed at preserving the nitrogen in the manure.

Fresh manure versus old manure

Manure ferments if allowed to lie in the shed or yard for very long, and the nitrogen is changed to the ammonia form. As long as the manure is moist, less of the ammonia is lost; but as it dries out, the ammonia evaporates. Thus if old manure is spread on a field and dries out before it can be covered or before rain washes the ammonia into the soil, its value as a nitrogen fertilizer is greatly reduced. Fresh manure, on the other hand, does not contain the ammonia form of nitrogen. When it is spread on a field and allowed to dry out, nitrogen is actually preserved, because the fermentation process that converts the nitrogen to the volatile ammonia form will not continue under dry conditions.

Where to put manure

As soon as spring grains are harvested, many livestock farmers begin to haul manure to stubble fields and recently cut hay fields. Others wait until fall and apply it on fall grains or on land to be fall-plowed. Still others spread it on frozen ground in winter and plow it under in the spring. And some top-dress it on recently planted cornfields or on permanent pastures.

Let us consider what happens under each of these conditions:

Old manure spread on stubble fields is likely to dry out. The result is that the nitrogen is lost, although the crop would still benefit from the potash, phosphate, and organic matter.

(Continued)

Spreading manure on fall grains has been shown to reduce freezing-thawing injury to the crops. Nutrient losses are low because low temperatures slow up fermentation and decay.

When manure is applied and plowed under immediately, little nitrogen is lost.

When manure is applied during the winter and plowed under in early spring, the low temperatures prevent serious nitrogen loss.

Top-dressing manure on cornfields makes it of little benefit to the crop as fertilizer. Where erosion is serious, however, the manure does help to reduce soil and water losses.

From an economic standpoint, the return is probably greater when manure is applied to corn than to any other field crop--at least under Illinois conditions.

Many times, however, time, labor, and machinery requirements dictate when and where manure is applied.

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CROPS AND SOILS

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July 30, 1956

ESTABLISHING AND MAINTAINING GRASS WATERWAYS

No. 23

Grass waterways are a necessity in fields where surface drainage water is directed to one or several outlets. Waterways, when constructed properly, save soil and make fields more workable. Here are a few facts to keep in mind when planning grass waterways for your farm, as suggested by the U.S.D.A. Soil Conservation Service. It is advisable to check with your farm planner or farm adviser to get detailed information on the actual project construction.

Design and Construction. Detailed dimensions are given in the Ready Reference or the Engineering Handbook for Farm Planners. Where tall fescue or reed canary grass is used, six extra inches of depth may be desirable. Design for a velocity of five feet per second to reduce silting on the better soils. Where practical, stockpile the top soil and return it to the waterway to provide optimum conditions for growing a sod cover.

Basic Soil Treatment. Fertilize with adequate amounts of phosphorus and potassium. Soil tests from adjacent fields will be a good guide for fertility requirements. Plow under a "stockpile" application of phosphorus--rock or soluble. Apply potassium at the same time and disk in. The pH level is usually adequate for grasses, so lime can usually be omitted from the treatment program.

Stabilizing Crops. Waterways that are prepared in the spring after grass seeding time should be seeded to a stabilizing crop, such as corn, broadcast at a rate of four to five bushels an acre. Make the grass seeding in the corn in August or early September. If it is necessary to clip the corn, remove the clippings.

Prepare the seedbed with a grain drill, rotary hoe, or straight-set disk so that the corn stubbles will not be torn out. At other seasons, a small grain may be used as a stabilizing crop. Grass can be seeded with the grain. Clip the grain frequently to allow the grass seeding to grow rapidly.

Starter Fertilizer. A surface application of 200 pounds of 10-20-0 or 400 pounds of 10-10-10 broadcast or 200 pounds of 10-20-0 drilled or the equivalent in plant food is recommended. A light application of strawy manure may be applied and disked in to serve as a mulch.

Companion Crops. Small grains are seeded with the grasses to provide quick cover. For successful grass seedings, clip the companion crop frequently to prevent excessive competition with the grass seedlings.

(Continued)

Seeding Mixtures

1. Tall fescue (alta or Ky. 31), 25 pounds an acre.
2. Bromegrass (southern varieties), 25 pounds an acre.
3. Under wet or critical conditions, 10 to 12 pounds of reed canary grass may be added to the tall fescue or bromegrass, because it has the ability to withstand a wide range of soil and moisture conditions. It spreads by rhizomes and creates a heavy sod. Timothy and redtop may be added to the bromegrass or fescue if desired, but pure seedings of timothy and redtop have often failed under severe conditions. A less palatable grass in the waterway, such as tall fescue, suffers less grazing damage during the spring and early summer than other grasses when the field is in pasture. If legumes like alfalfa and clover are omitted from the mixtures, it is easier to maintain a tough cover. Legumes weaken the cover in waterways and should not be included in the seeding except in wide meadow or pasture areas that serve as broad water-courses.

Packing. The final operation after seeding is to pack the center 8 to 12 feet of the waterway thoroughly. A well-packed seedbed will resist erosion and usually encourages quicker germination and emergence of the seedlings. A farm tractor may be used to do the packing. Avoid packing when the ground is too wet.

Maintenance

1. Clip the waterways and remove the hay. Delay the first clipping each year until after the bird-nesting period.
2. Top-dress the waterway every year with an application of 100 pounds of 0-20-20 fertilizer an acre in the fall and 25 to 35 pounds of nitrogen an acre in the spring.

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CROPS AND SOILS

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August 6, 1956

SOIL TESTING

No. 24

Probably no information can be of more practical value to the farmer than tests of his soil for lime, phosphorus, and potassium. By telling not only where he needs these materials, but how much of each he needs to the acre, they eliminate costly guesswork. The tests will make money for him by showing what treatments he needs to apply to his soil to produce top yields, and they may save him money by showing him where his soil does not need treatment.

Take soil samples correctly

No matter how accurate your laboratory may be in testing, that accuracy will be wasted if you do not take your soil samples correctly. A thimbleful from each soil sample is the size of the sample that is actually run through the soil test. This small amount of soil may represent four or five acres. It is important, therefore, to take each sample carefully so that it will represent the soil in those four or five acres. This is easy to do if you follow directions.

Get directions for collecting soil samples

You can get directions for collecting soil samples from your county soil testing laboratory. The diagram and directions for collecting soil samples show where to collect the eleven samples from a 40-acre field and also from smaller fields. To get a representative sample at each of the eleven locations on a 40-acre field, the directions say to collect five handfuls of soil within a square rod. Then mix them together to make up the sample for that location.

Let's say you are at the location where you will collect sample No. 1. The diagram shows where to collect the five handfuls to make up this sample. Take your first handful of soil from the spade at location No. 1 on the diagram. Then walk $3\frac{1}{2}$ paces to the corner of the square rod and take handful No. 2. Go on around until you have taken a handful from each of five points within a square rod. Mix these five handfuls thoroughly and take a full handful and put it into the sack marked No. 1. This is sample No. 1. Discard the rest of the soil from the five handfuls.

Recommendations are based on many factors

There are many factors for which you cannot test that will affect the results from the use of lime, phosphorus, and potash. Organic matter, soil tilth, type of soil, and degree of erosion all must be considered in a balanced soil fertility program. There are no soil tests to tell what kind of rotation you need to maintain organic matter and good soil tilth or to control erosion.

(Continued)

It is because of these things which cannot be tested that you should give as much information as possible about your soil when you send in the soil sample. You may wonder why the information sheet asks when limestone, phosphate, and other soil treatments were applied to the field that was sampled. The farm adviser, when he makes his recommendation, needs to know whether the field has been limed; if so, when; and whether other treatments have been applied. The reason is that test results on unlimed or unphosphated land may mean something altogether different from the same results on a soil that has already been limed.

For example, if the field has been limed within the past four or five years, some of the soil samples may still show a need for limestone. This does not mean that the test is inaccurate; it simply means that the limestone has not yet been mixed thoroughly enough with the soil to correct the acidity of all of the plow layer. There may still be areas of acid soil that have not been affected by the limestone, and soil from those areas may be included in the sample. If the farm adviser knows that the limestone or phosphate was applied previously, he will not recommend another application.

Fields need to be retested

A field should be retested every six or eight years. A retest will tell whether the soil needs more limestone and, if so, how much. It will also tell whether you need to apply the same amount of potash for another six to eight years or whether to decrease or increase the amount. Applying potassium fertilizer for one or two rotations will not necessarily bring the potassium supply in your soil to a satisfactory level. You may need to apply the recommended amounts for several rotations before the soil test will show that the amount can be reduced.

When you use rock phosphate, we suggest that you apply the recommended amount a second time after a period of eight years and then apply maintenance amounts of 700 to 800 pounds every eight years. When you use superphosphate, the test will tell whether or not the phosphorus level has been built up to where you can reduce the amount.

The tests will be of no value to you unless you understand them and follow the recommendations.

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CROPS AND SOILS

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August 13, 1956

WINTER OATS IN SOUTHERN ILLINOIS

No. 25

Data from winter oat variety tests conducted by the Agronomy Department of the University of Illinois indicate that this crop can be used to best advantage by farmers in southern Illinois. During 1955 and 1956 yields of winter oats exceeded yields of spring oats at the testing stations located at Carbondale, Eldorado, and Brownstown.

Advantages of Winter Oats Over Spring Oats in Southern Illinois

1. When winter oats survive the winter, they can be expected to give higher yields than the spring types.
2. Winter oats mature several weeks earlier than spring oats and usually escape many oat diseases and hot, dry weather that often reduces yields of spring oats.
3. Winter oats can serve as late fall pasture, as a companion crop for legumes and grasses, and as an erosion-control crop.

Disadvantage of Winter Oats

1. Winter oats are more susceptible to winter injury than winter wheat, rye, or barley.

Region of Adaptation. Winter oats can usually be grown successfully south of U. S. Route 50, which crosses the state from Vincennes, Indiana, to St. Louis, Missouri. In some years, when the winter has been mild, they have done well north of Route 50. However, if the winter oats fail, a spring-seeded crop like spring oats or soybeans can be seeded in the same field.

Date of Seeding. Late seeding is often the cause of failure of winter oats. The crop must be planted early enough to become well established before freezing weather. Seeding should be done in early September, about one week earlier than winter barley and about three weeks earlier than winter wheat. If the area is to be grazed, the seedings may be made in the latter part of August. Most of the adapted varieties of winter oats can be fall grazed. Because the Hessian fly does not readily attack winter oats, seedings need not be delayed to conform with the fly-free date for winter wheat. An early planted, well-established seeding of winter oats will often ripen in the spring two or three weeks earlier than spring oats.

Rate of Seeding. Two bushels of winter oats per acre, drilled, seems to be the minimum seeding rate for Illinois. Three bushels per acre may be better toward the northern limit of adaptation. Experimental data indicate that early seeding is more important than seeding rate.

(Continued)

Seedbed Preparation. The seedbed should be prepared in the same way as for any other small grain. Disking and harrowing are sufficient following row crops, but sod fields should be plowed in midsummer.

Soil Fertility. Winter oats respond to the same soil fertility treatments as other small grains. It is better to apply nitrogen in the spring than in the fall. On highly fertile soils, too high rates of nitrogen may cause lodging. In tests at West Salem, where 50 pounds of nitrogen was top-dressed in the early spring, the yield increase was two and one-half times as large as where nitrogen was applied in the fall at seeding time.

Varieties to Seed. Winter-hardiness is the most important characteristic to be considered in choosing a winter oat variety for southern Illinois. Recommended varieties are Dubois, LeConte, and Forkeddeer. Dubois stands well, is more winter-hardy than LeConte, and yields well. Forkeddeer is similar to Dubois but has weaker straw. LeConte is the least winter-hardy of the three, but it has the stiffest straw. Because of its poor survival, LeConte should be used only in the southern tip of the state, although it would yield well in other areas if it lived through the winter. Use only certified seed of a recommended variety that is winter-hardy. Make sure that it is winter oats. You may find it desirable to try this crop on a limited scale this year to give it a test on your farm.

Table 1. Winter Oat Data for 1956 in Southern Illinois

Variety	Carbondale		Eldorado		Brownstown	
	Yield bu/A	Test wt. lb/bu	Yield bu/A	Test wt. lb/bu	Yield bu/A	Test wt. lb/bu
LeConte	94	38.3	112	40.6	92	33.7
Dubois	97	38.4	108	40.2	98	36.8
Forkeddeer	96	39.4	107	39.8	112	36.6
Wintoka ^{a/}	94	39.0	99	39.6	82	37.0
Fulwina ^{a/}	92	37.6	102	38.4	91	35.0
Mustang ^{b/}	107	37.5	115	37.9	113	34.0
Cimarron ^{c/}	106	37.3	97	37.4	101	33.0
Av.	98.0	38.2	105.7	39.1	98.4	35.1

^{a/} Weak straw, tendency to lodge.

^{b/} New variety from Texas - susceptible to Helminthosporium leaf disease.

^{c/} New variety from Oklahoma - early, short, and weak-strawed.

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AGRONOMY

CROPS AND SOILS

NEWS

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COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS URBANA

DEPARTMENT OF FORESTRY

August 15, 1956

MANGANESE DEFICIENCY IN SOYBEANS^{a/}

No. 26

Symptoms

"Manganese deficiency is characterized by yellowing of the area between the leaf veins, ranging in color from pale green with slight deficiency to almost white with severe deficiency. The veins remain distinctly green until chlorosis approaches the 'white stage,' after which color disappears from the veins and the leaves fall from the plant. Under conditions of excessive field moisture, the leaves are also frequently stipuled with brown spots and tend to give a browned appearance. The deficiency seldom occurs over an entire field but is usually in an irregular pattern, frequently being more severe in the depression areas." It has been reported that the deficiency is most widespread in cool, wet weather.

Where Deficiency Occurs

For some years a manganese deficiency has occurred in some areas of northwestern Indiana. Until recently, related soil types in Illinois have shown little, if any, deficiency. However, farmer complaints and field investigations have revealed manganese-deficient soybeans in some areas of eastern Kankakee and Iroquois Counties. The deficiency has been observed on light-colored sandy soils as well as on sands that are high in organic matter. The pH range of these soils is 6.3 to 7.4. Manganese deficiencies in soybeans have not been confirmed in any other parts of the state.

Analysis of soybean plants in the laboratory has confirmed the fact that there is a manganese deficiency in Illinois. Soybean plants from the deficient areas contain as little as 3 to 5 parts of manganese per million, whereas plants from normal areas contain 20 to 45 parts per million.

On one farm in Iroquois County spray applications of manganese sulphate have been effective in eliminating the symptoms and increasing growth. Damage to plants from the spray has been slight. Soybean plants on calcareous sands and acid sands in southwestern Will County and western Kankakee County showed no symptoms and failed to respond to treatment.

In this same area a magnesium deficiency sometimes occurs on some acid sandy soils, but it should not be confused with manganese deficiency, as the symptoms are very different. Iron deficiency has the same general symptoms as manganese deficiency, but it has not been found in this area.

^{a/} The recommended applications and the description of the symptoms were taken from Purdue University Extension Bulletin 231.

(Continued)

Recommendations for Correcting Deficiency

Although it is late in the season to get a large yield response for treatment, it would be advisable to spray manganese sulphate on areas that appear to be deficient. Response to the treatment would verify the deficiency and indicate whether the soil should be treated next year.

"The deficiency can usually be corrected by spraying the affected plants with 10 pounds of manganese sulphate per acre in 15 gallons of water as soon as the deficiency is evident. Only sufficient water need be used to give good coverage of the plants. Earlier spraying will result in higher yields.

"Twenty-five or more pounds of manganese sulphate applied in the row with the mixed fertilizer is effective in preventing the deficiency and should result in higher yields than with spraying, since no stunting of the plants occurs."

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

August 27, 1956

1956 WINTER WHEAT YIELDS

These data are results from winter wheat variety trials conducted by the University of Illinois Agronomy Department on the DeKalb, Urbana, and Brownstown experiment fields.

Table 1.--1956 URBANA WINTER WHEAT VARIETY (COMBINE) TRIALS
Seeded October 18, 1955 - - - - - Harvested July 10, 1956

Variety	1956 Yield		Av.	1956 Average		Date head	Average Yields	
	After clover	After soybeans		Test weight	Height		2-yr. 1955-56	3-yr. 1954-56
	Soft Winter Wheat Varieties							
	<u>bu.</u>	<u>bu.</u>	<u>bu.</u>	<u>lb./bu.</u>	<u>in.</u>		<u>bu.</u>	<u>bu.</u>
Knox	40.0	30.0	35.2	56.0	29.2	5/25	42.5	43.5
Vermillion	46.7	39.0	42.9	54.7	31.2	5/27	50.5	47.8
Dual	47.0	32.3	39.7	55.7	36.0	5/31	46.8	45.3
Lucas	42.4	31.4	36.9	52.1	37.5	6/3	--	--
Seneca	33.7	26.4	30.0	52.1	38.2	6/3	33.1	36.7
Vigo	39.9	27.7	33.8	54.7	41.0	6/2	39.7	40.7
Royal	52.4	39.5	46.0	58.6	39.5	5/31	45.8	44.0
Saline	<u>49.6</u>	<u>36.0</u>	<u>42.8</u>	55.9	41.5	6/1	46.1	45.3
Average	44.0	32.8	38.4					
Hard Winter Wheat Varieties								
Triumph	41.6	30.4	36.0	56.7	27.2	5/22	41.3	41.5
Pawnee	53.5	40.3	46.9	57.5	33.0	5/26	45.9	45.6
Ponca	50.0	38.8	44.4	59.0	34.0	5/28	44.8	44.5
Concho	50.8	36.6	43.7	56.7	33.7	5/28	45.5	--
Westar	<u>53.8</u>	<u>39.9</u>	<u>46.9</u>	58.2	36.7	5/29	44.1	45.0
Average	49.9	37.2	43.5					
Average for test	46.3	34.5	40.4					

Table 2.--1956 DeKALB AND BROWNSTOWN WINTER WHEAT VARIETY (COMBINE) TRIALS
Seeded September 21, 1955- - -Harvested July 12, 1956

Variety	DeKalb			Brownstown		
	Height	Test weight	1956 yield	Height	Test weight	1956 yield
Soft Winter Wheat Varieties						
	in.	lb./bu.	bu./A	in.	lb./bu.	bu./A
Knox	40.5	57.6	39.5	39.5	59.5	50.2
Vermillion	41.7	56.7	42.3	40.2	59.5	50.2
Dual	41.5	56.4	45.3	47.0	57.5	49.5
Lucas	42.5	58.9	44.8	45.7	61.0	52.9
Seneca	42.5	55.0	38.3	45.2	60.0	47.9
Saline	47.5	57.5	38.8	50.2	61.2	54.1
Average			41.5			50.8
Hard Winter Wheat Varieties						
Triumph	38.2	61.3	47.9	34.7	60.7	50.2
Pawnee	40.5	60.3	45.7	38.5	60.0	46.8
Ponca	40.5	60.7	45.4	39.2	60.7	51.0
Concho	40.7	59.6	46.2	40.5	61.7	51.8
Westar	42.5	59.5	48.3	39.7	60.2	57.1
Average			46.7			51.4

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DEPARTMENT OF FORESTRY

Table 3.--SUMMARY OF 1956 WINTER WHEAT VARIETY TRIALS
(Yield data from Combine plots grown at five locations in Illinois)

Variety	Yield per Acre					Average
	DeKalb	Urbana	Browns- town	Bluffs ^{a/}	West Salem ^{b/}	
	Soft Winter Wheat Varieties					
	<u>bu.</u>	<u>bu.</u>	<u>bu.</u>	<u>bu.</u>	<u>bu.</u>	<u>bu.</u>
Knox	39.5	35.2	50.2	54.3	71.7	50.2
Vermillion	42.3	42.9	50.2	48.3	65.2	49.8
Dual	45.3	39.7	49.5	46.7	70.0	50.2
Lucas	44.8	36.9	52.9	--	50.7	46.3 ^{c/}
Seneca	38.3	30.0	47.9	49.9	68.7	47.0
Saline	38.8	42.8	54.1	52.1	62.0	50.0
Average	41.5	37.9	50.8	50.3	64.7	49.0
Hard Winter Wheat Varieties						
Triumph	47.9	36.0	50.2	50.2	62.5	49.4
Pawnee	45.7	46.9	46.8	59.7	68.5	53.5
Ponca	45.4	44.4	51.0	54.4	66.7	52.4
Concho	46.2	43.7	51.8	55.6	75.2	54.5
Westar	48.3	46.9	57.1	49.9	79.0	56.2
Average	46.7	43.5	51.4	54.0	70.4	53.2
Average for test	43.9	40.5	51.1	47.4	67.3	50.9

a/ Data from Bluffs supplied by Royal Oakes.

b/ Data from West Salem supplied by P. E. Johnson.

c/ Average of four locations.

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ACRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

October 1, 1956

FALL AND WINTER APPLICATIONS OF NITROGEN

No. 28

Both farmers and fertilizer distributors are giving more thought to the possibility of applying nitrogen to field and forage crops in the fall and winter. Doing the job then helps to distribute the labor load on farms and also relieves storage problems of fertilizer companies. Often the spreading can be done by truck without damaging the soil if it is done before the field is plowed or while the ground is frozen.

To get full value from the fertilizer, however, farmers who plan to apply nitrogen this fall will want to consider the following points:

Kind of carrier to use. Nitrogen leaches more easily from some carriers than from others. For example, on a permeable, well-drained soil when rainfall is normal, an ammonium nitrate carrier may lose twice as much nitrogen to drainage water in the winter as an ammonium sulfate or anhydrous ammonia carrier. Always check the potential leachability of nitrogen carriers, and use the non-leachable carriers for fall applications if winter leaching is a problem.

Soil temperature. Microbial activity in soils slows down at 50° F., and most of it ceases at 32° F. When soil temperatures go below 50° to 55° F., it is therefore best to use non-leachable carriers on medium-heavy to heavy-textured soils that have good internal drainage. On soils with tight clay subsoils and poor drainage, like some in southern and east-central Illinois, soil temperature and carrier are not too important because little nitrogen leaches from these soils during the winter.

Soil characteristics. Fall application of nitrogen is not recommended for sandy soils. On medium-heavy to heavy-textured, well-drained soils, apply only non-leachable carriers. Soluble nitrates move with drainage water. Tight clay subsoils restrict water flow and reduce loss of nitrate nitrogen by drainage. More nitrate loss can be expected on sandy than on heavier soils.

Rainfall. Heavy rainfall increases nitrogen losses on sandy and other well-drained soils. But when rainfall is below normal, little if any nitrogen is lost in drainage water. The nitrogen will move down but will still be within the zone of root penetration.

Vegetative cover. Plant roots are effective in reducing loss of nitrogen by leaching. Grass sods also allow little nitrogen to be lost in drainage water if the fertilizer is applied while the grass is still growing actively.

Residues plowed down. Because of the low temperatures, crop residues decompose little if any during the late fall or winter. Decay microbes are inactive and are not able to "tie up" leachable nitrogen when it is applied in the late fall. If residues have been plowed down, apply only non-leachable nitrogen carriers so that the nitrogen will stay in the soil and be available in the spring when soil temperatures are again favorable for microbial activity.

(Continued)

Methods of application. Nitrogen can be applied on the soil surface with a spreader or injected into the soil with a liquid or gas applicator. Spreading on plowed land or over cornstalks may cause nitrogen to be lost by erosion or runoff. However, such loss can be reduced by a heavy sod of grass. Risk of loss can also be reduced on fall-spread fields by disking the carrier in. Where runoff and erosion occur, injecting ammonia carriers into the soil may give better results than surface applications if field conditions permit.

Results of research. Applying non-leachable forms of nitrogen for corn in the fall after soil temperatures are down appears to be just as effective in increasing yields as applying in the spring in Illinois, Iowa, and Minnesota. Indiana reports that late applications of the ammonium types of nitrogen are satisfactory on the heavier textured soils but cause losses in well-drained soils. Ohio reports that spring applications are better than fall applications for corn, although yield differences are small. Research workers at all of these stations feel that more data are needed before final conclusions can be made.

Wheat seems to get less benefit than corn from fall applications of nitrogen, particularly when grown on soils that leach easily. In Illinois trials on permeable soils in dry winters when no leaching occurred, little difference in yield was noted for different times of application. On tight claypan soils, yield increases have been similar for fall- and spring-applied nitrogen. Wheat might be expected to make better use of spring-applied nitrogen because it has a shallow root system and its needs are greatest in the early spring when the soil is cool. Applying nitrogen in the fall for spring-seeded small grains is not recommended.

Applying nitrogen on grass (pasture or hay) in the fall will increase yields considerably. At Urbana it doubled yields of Kentucky bluegrass. The forage from the nitrated plots contained 4 percent more protein than that from the untreated plots. The nitrogen was applied in early October as ammonium nitrate. Other forage grasses will respond similarly to applications of nitrogen. But do not apply nitrogen to legumes because, if adequately nodulated, they will gather their own nitrogen.

If you are interested in further information on nitrogen and soil fertility, write to the Department of Agronomy, 210 Davenport Hall, Urbana, Illinois, for copies of two agronomy publications, AG-1589, Science and Economics of Soil Fertility, and Fact Sheet SF-28, Fall Nitrogen Application in Illinois.

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CROPS AND SOILS

NEWS

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URBANA

RECEIVED
OCT 11 1956

October 8, 1956

A NEW SOYBEAN DISEASE?

DEPARTMENT OF FORESTRY

No. 29

What seems to be a new soybean disease was reported in several areas in south-central and southern Illinois this past summer. Its early appearance was limited to widely scattered fields within an area. As the beans matured, the affected beans became more obvious in many more fields in more areas. Many farmers were not aware of the disease until the plants approached maturity.

The diseased beans were first thought to be infected with a virus, such as bean mosaic or bud blight. Repeated attempts by soybean pathologists to transfer the disease to healthy plants by mechanical methods have been unsuccessful, but possibly it may be transmitted by insects.

The symptoms seemed to be worse on soils that were lower in potassium, but the disease was too widespread to be attributed solely to low soil fertility. Also, beans from adequately treated fields were similarly affected.

Areas Where Found

The disease was first reported in Morgan and Greene Counties. Diseased plants were later observed in Madison and Clinton Counties. At the same time, similarly affected plants were found in Jasper and Crawford Counties. The disease has been observed as far north as U. S. Route 36. Reports indicate that it is scattered over the southern half of the state.

Extent of Damage

In some areas a few fields were infected so extensively that the beans were not worth harvesting and were a total loss. Some fields were only partly damaged - one portion being normal and another portion of the same field showing disease symptoms. In other fields only the borders 10 to 20 feet from the roadside showed damage. In most of the infected portions of fields, yields were reduced from 15 to as much as 75 percent of normal. Infected and normal fields were found side by side or across the road from each other.

Affected Varieties

Symptoms of the disease were found on all of the presently recommended varieties of soybeans grown in the areas.

(Continued)

Early Symptoms

Early symptoms of the disease were difficult to observe, as cool weather may affect many plants in the same way. The plants appeared to be growing slowly, and some stunting was noted. Leaf shape was somewhat abnormal. The leaf symptoms were similar to those caused by mosaic or 2,4-D damage.

Later Symptoms

The affected plants held their leaves longer than the healthy ones or the beans failed to mature, and "green spots" appeared in the infected fields at harvest time. Upon closer inspection, these green beans showed evidence of stunting and "dudding" (failure to produce seed pods). Some plants did have a few pods, but many of them contained only one bean. As a result, yield was drastically reduced. Leaves were puckered and showed evidence of bronzing. However, these same symptoms may also be observed on beans infected with bean yellow mosaic. The late symptoms of this disease resemble the late symptoms of bud blight except that the pods (if any) usually remain and do not drop off.

Methods of Control

Because the disease has not been definitely diagnosed, no treatment has been found to control it. However, do not plant beans in an infected field. Plant some other crop for several years before planting beans again. Also, do not save seed from infected fields. Buy next year's seed supply from disease-free seed sources, as the "disease" may be transmitted by seed.

Researchers are planning to make extensive tests in the infected areas next year to try to isolate the pathogen. The trouble may be caused by a combination of several viruses reacting together, or it may be a new strain of virus. It may not show up at all next year but, if it does, soybean pathologists at the USDA Regional Soybean Laboratory at Urbana will be on the lookout for it.

Next year, if soybeans do not seem to do well and if disease symptoms become very obvious, report that information to your farm adviser so that he may inspect the field and notify the proper authorities. Give complete information on cropping sequence, fertility applied, planting dates, and possibility of spray damage. Remember that careless spraying with 2,4-D and 2,4,5-T weed and brush killer may cause similar symptoms.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

October 22, 1956

CONTROLLING NOXIOUS WEEDS ON
AREAS DIVERTED TO SOIL BANK

FEB 14 1963

No. 30

Soil Bank regulations specifically state that the control of noxious weeds, as designated by the State ASC Committee, shall be the responsibility of the farm owner and farm operator without reimbursement under the contract. Such control may include the use of chemicals, clipping, or any other practical method of preventing the acreage from becoming a source of spreading noxious weeds.

The State Committee has designated the following weeds as noxious for purposes of the Soil Bank:

Canada thistle
Perennial sowthistle
European (or field) bindweed
Leafy spurge
Russian knapweed
Hoary cress
Curled dock
Wild garlic

Dodders
Bull nettle
Buckhorn
Quackgrass
Wild mustard
Johnsongrass
Ox-eye daisy

Wild carrot
Ragweed (common and giant)
Giant foxtail
Cocklebur
Velvet weed
Smartweed
Broomsedge

As a minimum, Soil Bank participants are required to mow all such weeds before seed forms. The proper use of chemicals or approved tillage operations will be considered satisfactory where clipping does not give satisfactory control.

2,4-D Can Be Used to Control Broadleaf Weeds. 2,4-D can be used to control or eradicate many broadleaf weeds, such as European (or field) bindweed, curled dock, dodder, buckhorn, wild mustard, wild carrot, ragweed (common and giant), cocklebur, velvet weed, and smartweed. Applications should be made at prescribed rates. Care must be taken not to direct sprays on legume foliage. Where weeds are confined to small areas, spot treatments with 2,4-D are suggested to reduce the danger of damage to surrounding vegetation.

Spot-Treat Wherever Possible. Spot treatment with chemicals is suggested to control weeds unless large areas are infested. In such cases the area should be chemically treated to kill the weeds and then reseeded to the original grass-legume mixture. Most herbicides kill grasses and legumes as well as weeds.

Use Soil Sterilants for Hard-to-Kill Weeds. Certain weeds can be eradicated only by using soil sterilants. These compounds kill all vegetation and make the soil non-productive for a year or more. The following soil sterilants and rates are suggested for controlling weeds in Soil Bank acres: Atlacide, five to seven pounds per square rod; sodium chlorate, three to five pounds per square rod; boron compounds, 15 to 25 pounds per square rod; and boron chlorate compounds, five to nine pounds per square rod. They may be applied dry or as a spray.

(Continued)

Use Chemicals for Specific Weeds. Canada thistle - Spray infested areas at the pre-bud stage with amino triazole at the rate of four pounds of acid in 30 to 40 gallons of water per acre, or spot-treat with soil sterilants. Two or three applications of 2,4-D may control some strains of the thistle. Amino triazole is toxic to other forage plants, so be careful, while spraying, to prevent possible damage.

Leafy spurge, perennial sowthistle, Russian knapweed, and hoary cress - Spot-treat with soil sterilants.

Wild garlic - Spot-treat with one pound of 2,4-D acid per acre before the seed bulb-lets develop.

Bull nettle - Spot-treat with soil sterilants or spray with amino triazole at four to six pounds of acid in 30 to 40 gallons of water per acre.

Quackgrass - Spray foliage with six to eight pounds of Dowpon acid per acre in sufficient water to give good coverage. To prevent damage to other grasses, confine spray to infested areas.

Johnsongrass - Spray foliage with 20 to 30 pounds of Dowpon acid per acre in sufficient water to give good coverage, or spot-treat with soil sterilants.

Ox-eye daisy - Control by clipping before the seed heads form.

Giant foxtail and broomsedge - Spray with six to eight pounds of Dowpon or TCA in 30 to 40 gallons of water per acre on infested areas. Additional late summer clipping before seed heads form may give control. Be careful, as Dowpon and TCA may kill other grasses also.

Use Chemicals With Care. Always take care in handling weed chemicals, as they are always potentially dangerous. Read directions carefully and apply the recommended amounts of water and chemical.

Clipping May Control Most Weeds. In most cases a timely clipping program is sufficient to prevent weed seed production. Clipping to a height of 4 to 6 inches while the legume or cover crop is small will control many early weeds without damaging the crop too much.

Try to delay clipping the areas until after the bird-hatching season if possible. Spot-treat with chemicals to avoid clipping unless there are too many weeds.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 5, 1956

SPRING OATS FOR ILLINOIS

DEPARTMENT
OF FORESTRY

No. 31

Every year many spring oat varieties are placed in replicated tests and carefully evaluated for yield, test weight, disease resistance, maturity, and lodging resistance. From the results of these tests, superior varieties are selected; their seed is increased and is then made available to Illinois seedsmen and farmers. The following table gives the yields and test weights of spring oat entries in the 1956 spring oat variety performance trials conducted by the University of Illinois Department of Agronomy.

Variety	Northern Illinois (3 locations)		Central Illinois (2 locations)		Southern Illinois (1 location)	
	Av. yield	Test wt.	Av. yield	Test wt.	Av. yield	Test wt.
	bu/A	lb/bu	bu/A	lb/bu	bu/A	lb/bu
Andrew	73.2	31.0	78.7	31.1	79.5	29.8
Beedee	84.3	33.4	78.3	33.0	79.1	31.7
Bentland	73.0	32.7	63.6	30.0	66.7	30.7
Branch	75.7	28.6	78.1	29.4	--	--
Burnett	86.3	32.0	80.0	32.0	95.5	31.0
Clarion	83.6	31.4	80.2	31.3	82.9	30.6
Clintland	78.9	32.5	69.7	29.8	69.6	29.4
Clinton 11	71.1	29.6	70.6	28.8	67.7	28.0
Fayette	72.3	32.4	65.9	31.2	75.4	28.9
Garry	85.9	27.8	77.2	29.1	--	--
Logan	77.3	30.5	79.3	30.1	78.1	30.5
Minland	79.4	27.2	73.0	27.6	--	--
Mo. 0-205	83.2	34.0	75.2	32.7	75.6	31.2
Nemaha	68.9	32.0	64.8	32.1	74.2	30.1
Newton	80.4	33.0	74.3	32.6	73.6	31.4
Putman	62.0	34.1	58.3	33.7	78.0	31.0
Rodney	76.8	30.0	74.5	30.7	--	--
Sauk	88.8	29.9	78.3	30.8	--	--
Simcoe	81.8	30.3	--	--	--	--
Waubay	82.3	31.5	81.9	31.9	84.2	30.4

New Varieties Being Recommended for Illinois

Logan was produced by the Illinois Agricultural Experiment Station from a cross of Benton x Marion. It yields similarly to Clinton and Andrew. In disease reaction it is similar to Clarion and Waubay, being susceptible to leaf rust, race 8 of stem rust, and Septoria black stem, but resistant to race 7 of stem rust. Logan is taller and several days earlier than Clinton but has about equal straw strength. It has a very thin-hulled yellow kernel with a test weight slightly lower than that of Clinton.

(Continued)

Newton was developed at Purdue from a cross of Nemaha x Clinton x Boone-Cartier. It matures about the same time as Clinton and has stood and yielded better than Clinton 11. Its straw is several inches shorter than that of Clinton and is perhaps the stiffest of any variety now being grown in Illinois. Newton has plump Nemaha-type kernels with relatively thick hulls. It is resistant to race 7 of stem rust and moderately resistant to leaf rust, but is susceptible to race 8 of stem rust and Septoria black stem.

Garry was developed in Canada from a cross of Victory x (Victoria x Hajira-Banner). It matures late and therefore should be restricted to northern Illinois. If grown in central or southern Illinois, it produces kernels with low test weight. Garry has a stiffer straw than either Sauk or Branch. It yields similarly to Sauk and better than Clinton 11 in most tests. It has large white kernels with thick hulls. Garry is resistant to races 7 and 8 of stem rust and is moderately resistant to leaf rust and Septoria black stem.

Fayette was developed in Wisconsin from a cross of Vicland x Branch x (Clinton² x Santa Fe). It was grown on a limited acreage in 1956, and seed will be offered to interested certified growers in 1957. Fayette matures very early and has a very short straw; therefore it should stand better than Nemaha. In most tests it has yielded better than Nemaha. Fayette has a medium-sized yellow kernel about equal in test weight to Clinton. It has excellent resistance to leaf rust and race 7 of stem rust but is susceptible to race 8 of stem rust and Septoria black stem. Fayette is probably best adapted to southern Illinois but may also be used in other areas where an early oat is desired.

Buying Tips. If you do not know your seeds, know your seedsman. Beware of out-of-state seed peddlers, unreasonable prices, unknown varieties, and unknown seed sources. Demand certified seed. Consult your farm adviser or the Department of Agronomy, University of Illinois, Urbana, for more information. Request publications AG-1725 and AG-1723a for results of the 1956 spring oat yield tests and Circular 754, "Spring Oats in Illinois."

Just a Reminder: There will probably be a spring oat variety demonstration plot in your county next year. Ask your farm adviser about it and make a sincere effort to see adapted varieties of spring oats growing side by side under your own weather conditions.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 12, 1956

No. 32

CONTROLLING WILD GARLIC AND WILD ONIONS AND WINTER BRUSH

Wild garlic and wild onions cause Illinois farmers to lose an estimated half million dollars or more a year through dockage in wheat and undesirable flavors in milk and meat products. Control of these weeds may well begin in the fall with the use of chemicals or fall plowing on areas that are not seeded to winter grains.

Growth. Both wild garlic and wild onions begin to grow in the fall from old plants as well as from bulblets. Fall growth starts any time from September to November, depending on rainfall. Both weeds develop rapidly very early in the spring. Underground bulblets begin to form on wild garlic in March. Aerial bulblets begin to form on both wild garlic and wild onions in May.

Both weeds are mature by the time small grain is ready to harvest, and many of the bulblets are harvested with the grain. By mid-July the old plants become dormant. In September and October the old plants and new bulblets begin their new life cycle.

Cultural control. Both wild garlic and wild onion can be controlled and eliminated by growing a crop that can be plowed in either late fall or early spring. If this crop can be alternated with one that can be cultivated during the growing season, such as corn or soybeans, both weeds can be eliminated in three or four years.

Plowing in late fall or early spring smothers the plants that have germinated and usually prevents underground garlic bulblets from forming. Cultivating then destroys any seedlings that appear with rains during the growing season. Three or four years of this program will exhaust almost all seeds and bulblets in the soil.

Disking is never as satisfactory as plowing because it does not turn under the top growth or properly turn up the bulblets.

Chemical control. Wild garlic and wild onions are not easy to control. They are not affected by 2,4-D in their mature stages, but they can be controlled with heavy applications of 2,4-D while they are young and growing rapidly. Because these weeds form new underground bulbs during March or April, it is important to spray at that time.

On stubble ground best results have been obtained by using 2 to 3 pounds of 2,4-D acid of the ester form per acre during October, November, February, March, or April. This heavy application cannot be used on small grains or legumes, but it can be used on soybean stubble, cornstalk land, grass pastures, or other areas. The best time to apply in the spring is in late March or early April if new plants come up in the treated areas. If the area is not sprayed until February or later, it is best to leave the land undisturbed as long as possible and not plow for corn or soybeans until at least three or four weeks after spraying.

(Continued)

In winter wheat, 1/2 to 3/4 pound of either ester or amine 2,4-D can be applied in the spring when the wheat is fully tillered and before the stem begins to joint. Research data show that applying 1/2 pound of 2,4-D ester per acre had little effect on wheat yields but reduced the formation of aerial bulblets by about 50 percent. The remaining plants were so deformed that few of the bulblets were picked up in the combine. Applications in late April have not been effective in controlling garlic in winter wheat. Wheat should not be sprayed in the fall or in the boot stage.

Controlling winter brush. Chemicals can be used effectively to destroy undesirable woody plants, vines, shrubs, and trees. This method is useful for cleaning up fencerows, ditch banks, and roadsides and for clearing land. For these purposes 2,4,5-T mixed with oil is recommended. Chemical applications to control winter brush should be confined to basal bark sprays and stump treatments.

Basal spraying. Shrubs and trees can be killed by applying sprays to the base of the trunk or stem. These sprays will kill species that are tolerant to foliage sprays, including some oaks and maples. The 2,4,5-T should be diluted with kerosene, fuel oil, or diesel fuel at the rate of 1/2 pound of acid in 3 gallons of oil or 16 pounds (4 gallons) of 2,4,5-T per 100 gallons of oil.

Basal applications can be made any time during the year, but fall and winter spraying will probably fit best into the farm workload. Sprays applied during the winter are also less hazardous to growing crops.

Spray the base of the trunk from the ground to a height of 18 inches. Circle the trunk completely, and spray until the soil around the base of the tree is wet from runoff. Basal spraying between December 15 and March 15 will give best results. Knapsack or power sprayers equipped with a solid cone nozzle are most satisfactory.

Chopping or peeling the bark on trees larger than eight inches in diameter may induce more complete kills.

Stump treatment. Soon after trees have been cut, mix 1/2 pound of 2,4,5-T acid, ester form, in 3 gallons of oil and apply to the stump, with a sprayer or paint brush, until it begins to run off. Treatments can be made any time of the year.

Ammate applied as a dry salt (1 tablespoon per 2 inches of diameter) or a concentrated water solution (6 to 9 pounds per gallon of water) prevents sprouting in most species.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 19, 1956

ALFALFA PRODUCTION AND THE SPOTTED
ALFALFA APHID IN ILLINOIS

No. 33

The spotted alfalfa aphid is now found in Illinois. It has caused damage in areas south of U. S. Highway 40 and in counties bordering the Mississippi River as far north as Hancock County. Occasional damage has also been noted north and east of this area. This insect can present a serious threat to alfalfa production if it overwinters in Illinois, but too little is yet known about it to make any positive predictions for 1957.

This aphid, an alfalfa pest of Asia, Africa, and Europe, was first found in New Mexico and California in 1953 and 1954. It became serious in the states south and west of Illinois and has now spread northward and eastward. Losses in California alone in 1955 were estimated to exceed 13 million dollars; this year they were even higher.

This fall the aphid damaged new alfalfa seedlings in western and southern Illinois. Apparently the dry weather favored rapid buildup of the insect and caused the seedlings to be more susceptible to damage. Whether the damage would have been as great with adequate soil moisture and high humidity, no one knows, but it is believed that rainfall and high humidity may decrease aphid populations.

Cropping Possibilities. If this insect becomes a serious threat to alfalfa production in Illinois, red clover, alsike and Ladino clover, lespedeza, birdsfoot trefoil, and other adapted legumes should be substituted for alfalfa in seeding mixtures until the pest can be controlled. Use of high-yielding grasses like orchardgrass, smooth brome grass, and tall fescue, adequately nitrated and properly managed, can also be considered. Substitutions should, however, be made only after all other control measures have been considered. Timely and proper use of certain insecticides may be beneficial when epidemics occur.

If the aphid causes the alfalfa acreage in Illinois to be drastically reduced, the demand for seed supplies of other grasses and legumes may rise sharply.

Particular attention should be given to controlling infestations on areas diverted to the Soil Bank, especially those in the Conservation Reserve. Unless a spray program is carried out, alfalfa seeded on such areas may not only be seriously damaged, but the aphids will reproduce and migrate to adjacent crop areas.

Resistant Varieties. The most practical and economical method of controlling the spotted alfalfa aphid is to use resistant alfalfa varieties. Some seed may be available in limited quantities in 1957. Lahontan, a new variety just released jointly by the USDA and the Nevada and California Experiment Stations, shows a considerable amount of resistance.

Lahontan equals Ranger in wilt resistance and has been a high-yielding and persistent variety in California and Nevada. Whether it will perform well in Illinois is not known; however, it is not believed to be adapted to the Corn Belt. It was, however, seeded in the 1956 alfalfa variety trials conducted by the University of Illinois Department of Agronomy. Seed supplies of this variety will be limited for at least two or three years.

Description and Life Cycle. The mature spotted alfalfa aphid, about 1/16 inch long, is pale yellow with rather faint black spots on its back. It may be either winged or wingless. Newly born aphids resemble the adults but are much smaller. An aphid matures in one to four weeks and then gives birth to an average of three or four young a day. The insects winter on and around alfalfa crowns, but their ability to survive the winter in Illinois has not yet been determined. The aphid feeds on alfalfa, burr clover, and medic (lupine), but has not yet been observed feeding on other legumes.

Resistant plants are found in many of our existing varieties. Breeding material derived from Turkistan alfalfas may also show some resistance, but it takes some time to incorporate this resistance into adapted varieties. An aphid-resistant strain of Buffalo alfalfa is being developed in Kansas, but seed will not be available for several years, and then only in limited quantities at first.

Damage Symptoms. Gradually enlarging brown areas in alfalfa fields may indicate the presence of this pest. Closer examination will show that the aphids are killing the plants. A sticky secretion, aphid honeydew, on the plants interferes with hay-making; a black mold that forms on the honeydew further complicates the situation.

Insecticides. One pound of malathion per acre or 1/4 pound of parathion per acre (applied by experienced operators) will protect the crop for about two weeks or longer. Early treatment before the population becomes too great may be profitable. One and one-half pounds of DDT may also control the aphid, but it should not be used on hay crops to be fed to dairy cattle or livestock being fattened for slaughter. The value of BHC or lindane has not yet been determined.

Insecticides are, however, only a stop-gap or emergency measure, as three to five applications per season may be needed and all infested fields must be treated to reap the most benefit. Furthermore, insecticides will tend to reduce the number of natural enemies of the aphid in the field.

Besides insecticides, the use of resistant varieties of alfalfa or the substitution of other legumes is our best hope if this aphid does winter or migrate annually into Illinois.

Prepared jointly by entomologists and agronomists of the Illinois Agricultural Extension Service and the Illinois Natural History Survey.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 26, 1956

PUBLICATIONS OF UNIVERSITY OF ILLINOIS
AGRONOMY DEPARTMENT

No. 34

The following list contains some of the most popular Agronomy Department publications of the past few years and also some more recent releases with which you may not be familiar. We present them as a guide to you in obtaining up-to-date information from your Agronomy Department. Order by number (B - bulletin; C - circular; AG - Agronomy mimeograph; SR - Soil Report) and/or title.

Corn

- AG1645 Recipe for 100-Bushel Corn
- AG1707 Effects of Planting Rate and Light Intensity on Corn Yields
- AG1709 Establishing Legumes in Corn
- AG1718 Breeding Corn Adapted for High Planting Rates

Small Grains and Oil Crops

- B556 Soil-Borne Wheat Mosaic. 35 p.
- C726 Crops for Emergency Plantings. 8 p.
- C754 Spring Oat Varieties for Illinois. 16 p.
- AG1617 Winter Oats - A Crop for Southern Illinois
- AG1639 Oat and Wheat Seed Treatments
- AG1692 The Place of Grain Sorghums in Illinois
- AG1717 1956 Winter Wheat and Rye Variety Trials
- AG1719 1956 Winter Barley Trials
- AG1723 1956 Spring Oat Data
- AG1725 1956 Summary of Illinois Spring Oat Variety Demonstrations

Legumes and Grasses

- B569 The Clark Soybean for Illinois. 4 p.
- C559 Sweet Clover for Illinois. 24 p.
- C647 Pastures for Illinois. 64 p.
- C649 Better Farming With a Legume-Grass Program. 12 p.
- C650 Ladino Clover in Illinois. 12 p.
- C676 Soybean Diseases in Illinois. 32 p.
- C682 Long-Season Pastures for Illinois. 8 p.
- C703 Five Steps in Pasture Improvement. 16 p.
- C725 Growing Birdsfoot Trefoil in Illinois. 16 p.
- C727 Growing Red Clover in Illinois. 8 p.
- C740 Keeping Southern Illinois Pastures Productive. 12 p.
- C743 How to Make Good Grass-Legume Silage. 6 p.
- C756 Alfalfa. 19 p.
- C760 Five Years of Tests of Soybean Varieties for Illinois. 12 p.
- AG1713 Effects of Frequency and Dates of Cutting on Dry Matter Yields of Sudan-Grass Varieties
- AG1716 Effect of 5 Legumes and Grass Species on Performance of Pasture Mixtures
- AG1727 Seeding Mixtures for Soil Bank Acres

Weed Control

- C718 Weeds of the North Central States. 239 p. (Charge)
- C742 Chemical Control of Weeds and Brush. 12 p.
- AG1708 Weed Control Studies
- AG1730 Summary of 1956 Illinois Chemical Weed Control Demonstrations

Soils

- B539 Soil Building With Legumes. 16 p. Describes results from Illinois soil experiment field
- B540 Costs and Benefits From Soil Conservation in Northeastern Illinois. 36 p.
- B550 How Valuable Are the Soils of Central Illinois? 36 p. Shows relative values based on farm earnings

(Continued)

Soils (Cont.)

- B577 Yield and Composition of Corn Forage as Influenced by Soil Fertilization. 20 p.
B587 Field Descriptions and Analytical Data of Certain Loess-Derived Gray-Brown Podzolic Soils in the Upper Mississippi Valley. 80 p. (Charge)
C575 How to Farm on the Contour. 6 p.
C593 Grass or Gullies. 20 p. Tells how to build and maintain grass waterways
C604 Shall We Fall-Plow or Spring-Plow in Northeastern Illinois? 8 p.
C655 Tilt of Corn-Belt Soils Cannot Be Maintained Without Legumes and Grasses. 8 p.
C663 Handling Northeastern Illinois Soils. 16 p.
C667 Protecting Your Soil. 24 p. A brief guide to sound conservation practices.
C721 Limestone--How to Use It, When to Use It, Where to Use It. 12 p.
C724 Soil Treatment Recommendations Based on Soil Tests. 4 p.
C734 Plain Talk About Soil Management. 16 p.
C758 Understanding Soils. 40 p.
SR77 Henderson County Soils. 64 p.
SR78 Lawrence County Soils. 92 p.
AG948 The Morrow Plots
AG1443 Illinois Soil-Type Descriptions. 293 p. (Charge)
AG1481 Nitrogen for Illinois Corn
AG1562M What's in the Fertilizer Bag
AG1571 Nitrogen Fertilizers - What They Are and How They Act
AG1578 Effect of Cropping Systems on Corn Yields and on Physical Properties of Some Dark-Colored Soils
AG1588 Nitrogen Recommendations
AG1656 Illinois Soil-Testing Data by Counties
AG1674 The Status of Minor Elements in Illinois Soils
AG1677 Laboratory Results on Soil Samples Submitted from Illinois for North-Central Regional Nitrogen Study
Annual summaries of soil experiment fields (request by name of experiment field)
AG1699 Sixteen Years of Soil Improvement at Brownstown Experiment Station
AG1705 Effect of Nitrogen Fertilizer and Legume Catch Crops Used With a Rotation
AG1710 Northern Illinois Experiment Field
AG1711 Nitrogen Composition of Grain and Stover from Nitrogen Soil Test Locations, 1955
AG1712 Winter Application of Nitrogen Fertilizer
AG1715 Procedure for 56-57 Field Experiment With Nitrogen Under NC-16 Mineral Def. Project
AG1729 Fertilizer, Fertilizer Materials and Rock Phosphates Sold in Illinois, 1-1-56 to 7-30-56
AG1731 Available Water-Holding Capacity of Some Illinois Soils

General

- Agronomy News. Timely Release of Current Agronomic Research Results
Agronomy Facts, Vol. 1, Vol. 2, and Vol. 3 (Charge). Compilation of brief articles on pertinent agronomic topics
Crop Varieties for Illinois (chart 32" x 21")
AG162 Graduate Study in Agronomy. Brochure for prospective students
AG1722 Managing Soil Bank Acres in Illinois

For topics not covered here or for more specific information, write to the University of Illinois College of Agriculture, Urbana, Illinois. Also watch the Agronomy News for the latest publications of your Agronomy Department and, if possible, tune in to WILL, the University of Illinois Station, for Agronomy topics to be heard Monday of each week from 12:15 to 1:00 p.m. on the Illinois Farm Hour.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

DEPARTMENT
OF FORESTRY

December 31, 1956

No. 35

THE SUBSOIL MOISTURE SITUATION DURING 1956

Last spring two issues of Agronomy News were devoted to discussion of a survey of subsoil moisture conditions in Illinois. That survey indicated that large areas in the central, western, and northwestern parts of the state were abnormally low in subsoil moisture. Under normal conditions, during July and August a corn crop draws heavily on water stored in the subsoil during the previous winter and spring. For this reason the prospects for a normal corn crop in much of Illinois did not seem good last May. But now that the harvest is in, it appears that 1956 was the best corn year on record in Illinois.

Let us examine Figure 1 to see what was responsible for this very pleasant surprise:

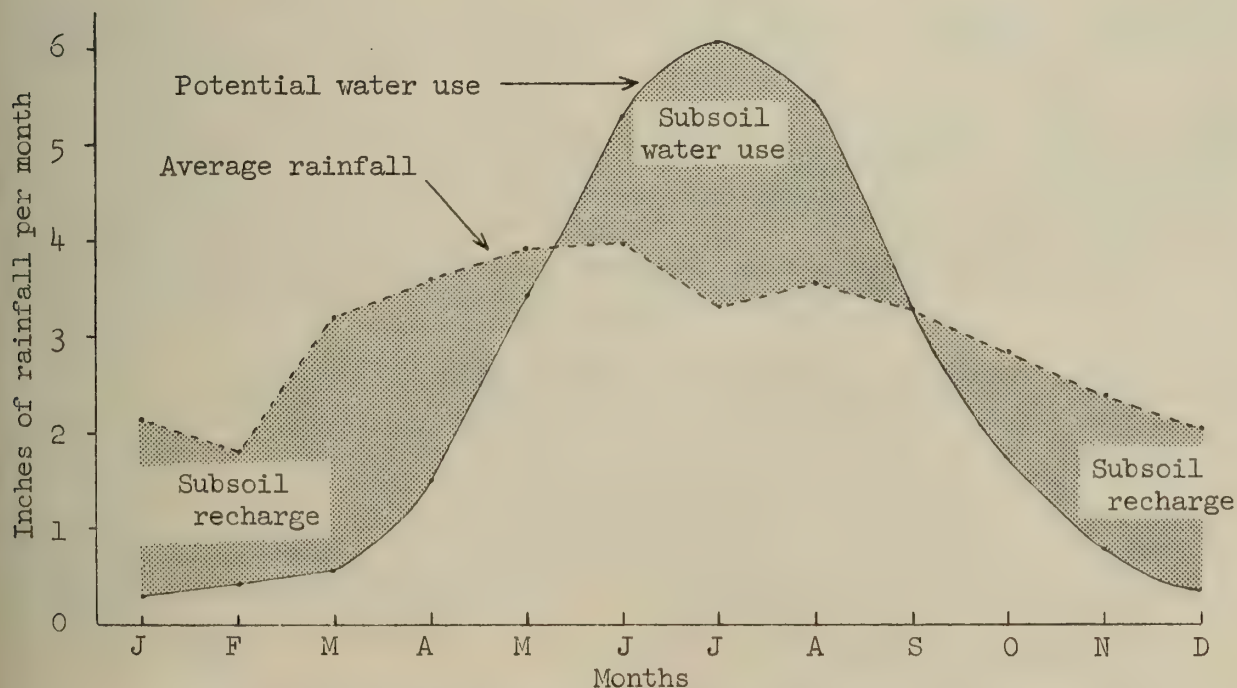


Figure 1. Water demand compared with normal rainfall

This graph shows the normal rainfall and water use by months for central Illinois. We find that during the summer months more water is used than is received. During these months water stored in the soil is used to supplement that received in rainfall. The soil moisture accumulates during those months when rainfall exceeds

(Continued)

water use. During the fall of 1955 and the winter and spring of 1956, rainfall was considerably below normal and the subsoil was not recharged with water at the beginning of the growing season. Fortunately, however, rainfall during July and early August was far above normal, the amount nearly equaling the water used during this peak period. It was therefore not necessary for the corn crop to use subsoil moisture in the usual amounts. The fortunate excess of rainfall of mid-summer shown in Figure 2 explains why corn yields reached record-breaking levels in Illinois in 1956 despite a critical subsoil moisture shortage.

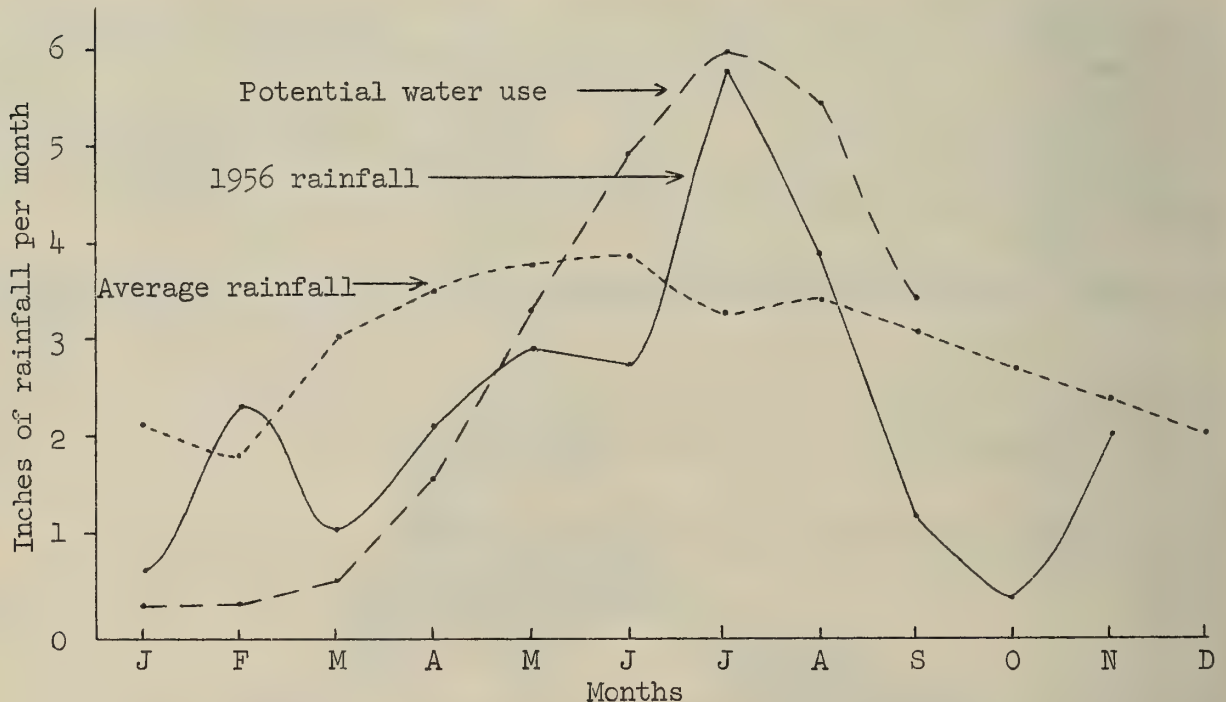


Figure 2. Water demand compared with 1956 rainfall

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CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

URBANA

February 6, 1957

No. 36

WHAT HAPPENS TO THE NITROGEN IN NITROGEN FERTILIZERS WHEN THEY ARE APPLIED IN THE FALL AND WINTER?

Many farmers apply nitrogen fertilizers in the late fall or winter. Since the fertilizer lies in the soil for some time before the plants use it, some of the nitrogen may be lost by leaching or by conversion to nitrogen gas by soil microbes. The extent of loss will depend on the weather, soil conditions, and possibly the kind of nitrogen that is applied. Previous experiments indicate that amount of rainfall may also affect extent of loss.

New Research at Urbana

An experiment is in progress at Urbana on a Flanagan silt loam to determine how much nitrogen is lost from three forms of nitrogen fertilizers applied in the late fall.

In this experiment, nitrate, ammonium, and urea forms of nitrogen were each applied to plots at rates of 0, 60, 120, and 240 pounds per acre. The plots were watered during the winter and spring at three rates to simulate varying winter moisture conditions. These rates were: high, 26.7 inches (as high a winter rate as can be expected once in ten years); medium, 19.6 inches (65-year average--November to May--at Urbana); and low, 13.4 inches (as low a winter rate as can be expected once in ten years).

To evaluate the amount of available nitrogen left in the soil at the end of this period, Sudangrass was sown in the plots in late May. Rainfall and applications of water were uniform on all plots after seeding. The Sudangrass was harvested and analyzed for total nitrogen to determine how much the crop had removed under each treatment. The differences between these figures and the original application rates indicate the amount of loss occurring between fertilizer application and crop seeding.

Results to Date

During 1955 the fertilizer treatments caused no differences in crop yields. The percent of total nitrogen was, however, higher in the forage from the plots receiving the higher rates of nitrogen. At the same time there was less total nitrogen in the crop harvested from the heavily watered plots, indicating that more nitrogen is lost under high moisture conditions. There appeared to be little difference in effect of moisture on the various forms of carriers.

In 1956 also, as Figure 1 shows, the crop removed less nitrogen as the rate of watering increased. The conclusion therefore is that heavy rainfall during the winter and spring does cause losses from fall- and winter-applied nitrogen fertilizers.

In addition, the data in Figure 2 show that under conditions of high moisture more of the nitrate than of the ammonium or urea form of nitrogen may be lost. Under average or low moisture, however, the loss differed little among the three forms of nitrogen used in the experiment.

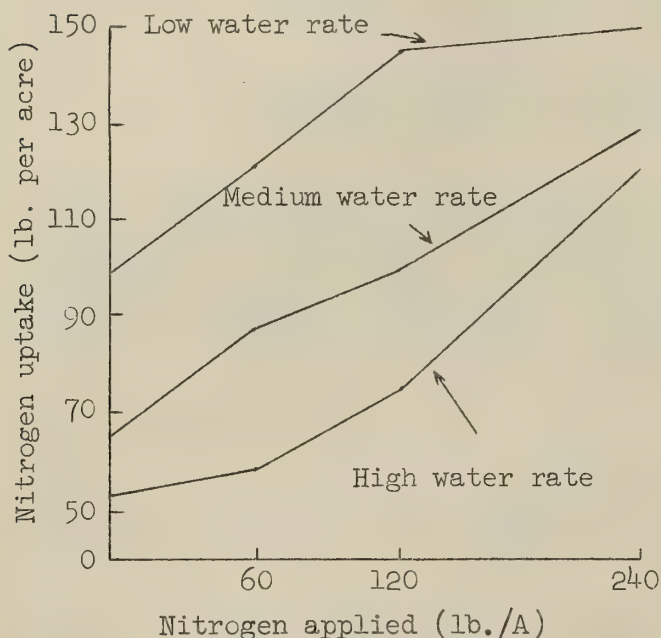


Fig. 1. Effect of water rate on nitrogen uptake by Sudangrass

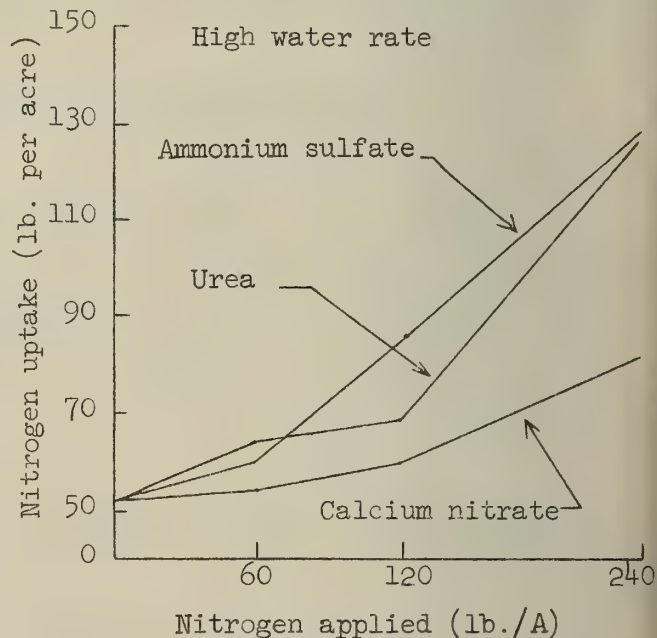


Fig. 2. Effect of nitrogen carrier on nitrogen uptake by Sudangrass

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February 25, 1957

RANDOX, A NEW CHEMICAL TO CONTROL
WILD MILLET (GIANT FOXTAIL)
IN CORN AND SOYBEANS

No. 37

Randex (alpha-chloro-N,N diallylacetamide) will be available for use in 1957. This new pre-emergence grass-killing herbicide has just been cleared for use in corn and soybean fields by the Pure Food and Drug Administration. It will kill wild millet, or giant foxtail, green and yellow foxtail, barnyard grass, downy brome grass, and other annual grasses that infest many crops. Experiments and observations made in 1956 indicate that Randex is very effective in killing these grasses if it is applied correctly and if moisture conditions following application are favorable. Both corn and soybeans have a tolerance to this chemical.

When to Apply

Randex should be sprayed on the soil at planting time or before the grass and crops emerge. Like other pre-emergence sprays, it is most effective when there is enough moisture to cause the weed seeds to germinate. If the soil is too dry for two or three weeks after treatment, its effectiveness may be somewhat reduced. It should not be used on sandy soils or on light soils that are subject to severe leaching.

Too early cultivation after treatment may reduce the effectiveness of pre-emergence treatments; Randex will last three to five weeks. If, however, chemical control of the grass appears poor, the field should be cultivated as soon as practicable.

How Much to Apply

For broadcast applications, use 4 quarts of Randex in at least 20 gallons of water per acre.

For band applications, ^{1/} where the spray is applied in about a 10-inch band directly over the planted row, use 1 quart of Randex to about 5 gallons of water if the crop is planted in 40-inch rows. In other words, with band applications about four acres can be sprayed per gallon of Randex. When the row centers are cultivated, it may be desirable to use fenders to protect the treated area and prevent fresh weed seeds from getting into the crop row.

Broadcast treatments may be better than banding for problem areas with heavy infestations of grass, particularly those adjacent to fencerows and drainage areas.

Use With 2,4-D

In corn fields where both grasses and broadleaf weeds are a problem, mix 3 quarts of Randex with 2 1/2 pints of ester 2,4-D and spray in 20 gallons of water per acre at planting time. To reduce cost, this mixture can also be placed in a band over the planted crop row. Do not use the Randex-2,4-D mixture in soybeans.

^{1/} For information on band spraying and equipment, write to the Department of Agricultural Engineering, University of Illinois, Urbana, Illinois, for Tractors and Machinery No. 6, "Equipment for Band Spraying."

(Continued on other side)

1956 Results With Radox

On 23 corn fields where Radox alone was applied in 1956, full-season control was generally 80 percent or better. In several of the fields where the chemical was not effective, the poor results were due to mechanical difficulties in making the initial application.

Where Radox was mixed with 2,4-D to control both grass and broadleaf weeds, the results were more consistent. Several locations reported 90 percent full-season control or better. In several areas that were severely infested with wild millet, even if the grass was not fully controlled, corn yields increased rather significantly as a result of the treatment. Judging from observations, it would appear that any degree of control might increase corn yields to the point where Radox could be used effectively in serious infestations of wild millet.

Grass control was excellent in several soybean fields but was poor in several others. In most cases where control was poor, dry weather following treatment or mechanical difficulties, or both, were at least partly responsible.

Where yields were measured, there were rather striking differences in favor of the Radox-treated areas. Several farmers have said that Radox-treated plots can be combined much faster and with less loss of beans than untreated areas.

Other points to Consider

1. Radox kills grass only and should be applied on the soil at planting time.
2. Read container labels carefully before preparing to spray.
3. Wear rubber gloves and goggles. Radox is irritating to the skin. If it comes into contact with skin or eyes, flush areas thoroughly with soap and warm water.
4. Use nozzle tips that will deliver at least 20 gallons of spray per acre. For band placement, use band-type nozzles if possible.
5. Maintain a pressure of 30 to 40 pounds per square inch (psi). Too high pressures break the spray into fine particles that are subject to wind drift, particularly when a band treatment is being applied.
6. Keep sprayer booms as low as possible to reduce wind drift.
7. Because Radox is expensive and needs to be applied properly, it may be advisable to get experience by treating a small area before treating large acreages.

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UNIVERSITY OF ILLINOIS

URBANA

March 4, 1957

CLIMATIC CONDITIONS AND SOYBEAN YIELDS

No. 38

The favorable distribution of rainfall in 1956 and its effect on crop yields was the subject discussed in AGRONOMY NEWS NO. 35. Yields were generally outstanding in 1956, even though the amount of soil moisture was low at the beginning of the season, as was total amount of rainfall for the year. A comparison of weather conditions during the years since 1951 indicates that slow vegetative growth during the early part of the summer and moderate midsummer temperatures in 1956 probably made it possible for plants to use water more efficiently and thus contributed materially to the excellent yields.

The data in the following table show the soybean yields in uniform test plots at the Agronomy South Farm and rainfall and temperature data obtained there during the years 1951 through 1956.

Variety	Maturity groups	Yields (bu./acre)					
		1951	1952	1953	1954	1955	1956
Harosoy	II	50.4	32.8	33.0	36.8	26.1	45.8
Hawkeye	II	44.6	33.3	24.2	37.8	25.7	47.7
Lincoln	III	48.2	36.9	29.7	34.4	26.0	42.1
Clark	IV	52.2	36.8	33.2	37.4	22.5	42.7

Rainfall (inches)

June	4.98	5.70	2.92	2.73	3.01	1.89
July	3.66	2.09	3.83	2.92	5.47	5.82
August	4.58	2.76	.68	4.69	1.83	3.79

(Average Maximum/Minimum Temperature*)

June	78/60	88/66	89/65	90/65	78/58	85/63
July	84/64	88/66	87/65	92/66	90/70	82/63
August	82/62	83/62	88/62	84/64	88/66	84/63

* The figure to the left of the slant is the average of maximum temperatures for each day in the month. About half of the days in the month would have a maximum higher than the figure shown, and about half would have a maximum lower than that shown. The figure to the right of the slant is the average of minimum temperatures for each day in the month.

Yields were higher in 1956 than in any year since 1951. Although 1954 was regarded as a dry year and soybean yields for that year were the lowest of any during the period from 1951 to 1956 there was not much difference in total summer rainfall (June, July, and August) at the South Farm during 1952, 1954, 1955, and 1956. It is evident that some factor in addition to total rainfall was especially

(Continued)

favorable in 1956 and especially unfavorable in 1954. This factor was probably temperature. July maximum temperature in 1956 (82°) averaged 5 to 10 degrees lower than the maximum in July of any of the four preceding years. In 1954, July maximum temperature averaged 92°. A 10° temperature difference every day for a month not only would increase the water requirements of the plants, but would also increase the amount of food materials that would be burned up in the life processes of the plant. Thus these food materials would not be available for storage in the seed.

It is interesting to compare conditions in 1956 with those in 1951, when very good soybean yields were also obtained. While rainfall in June 1951 was relatively high the average maximum temperature was 78° at least 10° lower than in June 1952 (88°), 1953 (89°), and 1954 (90°). July 1951 was also characterized by moderate temperature. In June 1951, low temperatures probably slowed early growth. In June 1956, similar results were probably due to low soil moisture. In each of these two years, early vegetative growth was therefore limited, leaving more water in the soil for use later in the season.

From comparison of results in 1951 and 1956 with those in the intervening years, it appears that slow growth in June followed by adequate moisture and moderate temperatures in July and August are most likely to lead to the best soybean yields. In Illinois weather conditions after September 1 have little effect on yields except indirectly as they affect drying down of the seed pod, shattering, plant lodging, and harvesting.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 15, 1957

GRAIN SORGHUMS IN ILLINOIS

DEPARTMENT
OF FORESTRY

No. 39

Illinois farmers are becoming interested in growing grain sorghums for several reasons: (1) they want to find a grain crop to substitute for corn in the corn allotment program, (2) grain sorghums can withstand dry weather better than corn and thus they may be grown to advantage in certain areas in the state, and (3) the new hybrid varieties are yielding about 20 percent more grain per acre than the older open-pollinated varieties.

1956 Grain Yields

Eight grain sorghum variety trials were conducted in 1956 by the Department of Agronomy in which yields from 16 to 23 sorghum hybrids and from 3 to 14 open-pollinated sorghum varieties were compared with yields of corn. In central Illinois the sorghum hybrids outyielded the corn, but the reverse was true in southern Illinois. The corn in every test was probably at a disadvantage, since it was planted later than normally and was included as only one entry in each trial. It is not suggested that the sorghum varieties will yield better than corn under conditions that are favorable to corn, but it is probable that they will outyield corn under conditions of very low rainfall and drought. In seven locations the hybrid sorghums yielded 21 percent more grain per acre than the open-pollinated varieties.

Problems Associated With Growing Grain Sorghums

Field drying of grain will be one of the biggest problems encountered in growing grain sorghums in Illinois. Under conditions of normal or abnormally heavy fall rainfall, it would be almost impossible to get the grain dry enough for storage unless artificial drying equipment was used. The grain sorghums may head-sprout in the field in a wet fall.

Birds and insects continue to be a serious threat to sorghum production in Illinois. Small acreages that are near buildings or trees may be severely damaged by birds as the grain matures. Chinch bugs will readily attack sorghums. Corn ear worms may also infest the heads and cause some reduction in yield. Both of these insects can be controlled with an insecticide like dieldrin. In the trials there was also evidence of corn borer damage in many fields, although the infestations were substantially less than in corn fields.

Seed supplies, particularly of the new hybrid sorghums, are scarce. For some hybrids there will be no seed supply in 1957. Because the seed of tested hybrids is short, it may be better to make limited plantings of two or more tested hybrids along with an adapted variety than large-scale plantings of untested hybrids. Choose a sorghum variety or a hybrid that matures as early as the corn you plant, or earlier. Hybrid sorghum seed, like hybrid corn seed, should be bought new each year.

Planting

Plant sorghums when the soil is warm (70° F.) or generally about 2 weeks after corn planting. Secure special sorghum planter plates for your planter if possible; otherwise, use small-holed bean or popcorn plates.

(Continued)

Use only certified and treated seed. Plant it at the rate of 4 to 6 pounds an acre from 1 to 2 inches deep in a well-prepared seedbed. In most cases 6 to 8 seeds per foot will give a desirable stand. Experiments conducted by the Agronomy Department in 1956 indicated that one plant every 3 inches in the row was most desirable for highest yields. Plants that were 3 inches apart in the row grew 4 to 8 inches taller than the more widely spaced plants but had fewer slow-maturing branch heads. The heads on the plants spaced 3 inches apart dried faster and produced more grain than those spaced 6, 9, and 12 inches apart.

In the same experiments, sorghums planted in rows 30 inches wide produced an average of 10 more bushels per acre than those planted in 40-inch rows. Conventional planting and cultivating equipment has to be altered to handle 30-inch rows.

Fertility Requirements

Phosphorus and potash requirements for sorghums are quite similar to those for corn. However, in the 1956 experiments there was little if any yield increase from applying 50 to 100 pounds of actual nitrogen on grain sorghums.

Weed Control

Because the sorghums emerge and grow very slowly, early-germinating weeds and grasses may become a serious problem, particularly during a wet season. Cultivate early and use fenders to avoid covering the small plants.

Applications of 2,4-D can be used to control broadleaf weeds in sorghum as in corn. However, use as light a rate as possible.

Radox, applied as a pre-emergence spray at the broadcast rate of 4 quarts in 20 gallons of water per acre, gave excellent grass control in the 1956 experimental plots without injuring the sorghum. If Radox is band sprayed (10 to 12 inch band over the row) only 1/3 to 1/4 as much chemical and water is required per acre. This treatment will control the grass in the row and allow the row centers to be cultivated earlier.

Harvesting

Grain sorghums can be harvested with a combine. Adjust the concaves to reduce seed cracking.

For further information on variety performance, write to the Department of Agronomy, University of Illinois, Urbana, Illinois, for AG1738, 1956 Results From Grain Sorghum Variety Trials in Illinois.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

DEPARTMENT
OF FORESTRY

March 25, 1957

No. 40

SUGGESTIONS FOR MAILING PLANT SPECIMENS

This is the time of year that your Agronomy Department and local farm advisers begin receiving plant specimens mailed in by farmers. From now until next fall it is expected that many requests for identification of plant diseases, nutritional deficiencies, weeds, crop plants, and insect damage will be received.

What is needed for identification

Many times, when plant specimens arrive, there is nothing but a dried-up, leafless stem and a lot of broken and shattered leaves in the bottom of the envelope. The specimens were ruined in transit because the sender failed to take proper precautions to preserve them before mailing. In such case identification is difficult at best, and often impossible.

To insure accurate identification, the specimen should arrive in a fresh condition, with the leaves unshattered and still attached to the stem. The entire plant should be mailed, because the roots, stems, and leaves all are needed to aid in positive identification. In addition, floral and seed parts, if they have formed, will help a great deal.

Preparation for mailing

You can help your Agronomy Department and local farm advisers to help you by following these suggestions for preparing specimens for mailing:

1. Select a specimen that appears to be typical of the weed, disease, deficiency, or insect damage you want identified. If possible, in cases of disease, send two or more plants in different stages of the disease.
2. In most cases a green specimen in fresh condition is needed for identification. Do not merely stick the plant in an envelope and mail it. Instead, wrap the roots and soil in newspaper so that the soil will not get all over the leaves and floral parts in transit. Place the specimen in a plastic freezer bag or locker bag or a similar moisture-proof container, and seal it. Then put the plastic bag in a mailing tube, if obtainable, or a box, or some other sturdy packaging.

If a weed or crop plant is to be identified, a second, but poorer, method is to place the specimen between two pieces of cardboard and then put it in a large envelope or wrap it securely.

In either method, if the plant is tall it may be cut into several sections. Be sure to include the roots, as well as the vegetative parts, and the floral and seed parts if they are present.

Send this information with your specimens

1. How widespread is the condition or plant to be identified? Did it just start? Is it spreading fast?
2. What crop is growing in the field from which the specimen was taken? Give variety name if known. What crop was grown in the same field last year?
3. Where was the specimen located in the field (in the center; along the fencerow)?
4. From what kind of soil was the specimen taken (sandy, clay, well drained, poorly drained)? How much fertilizer has been applied in the last few years; how much lime?

When and where to send plant specimens

To avoid delay in delivery due to slower postal handling over week ends, try to prepare and mail plant specimens early in the week, preferably on Monday. For prompt delivery, be sure to put your name and address on the package.

You may send plant specimens either to your farm adviser at your County Extension Office or to your College of Agriculture at the following addresses:

Plant specimens for identification of insect damage may be sent to: Dr. H. B. Petty, Extension Entomologist, 280 Natural Sciences Building, University of Illinois, Urbana, Illinois.

Plant specimens for identification of plant diseases, nutritional deficiencies, weeds, or crop plants may be sent to: Crops Extension, 213 Davenport Hall, University of Illinois, Urbana, Illinois.

Correction in previous issue

An error has been found in Agronomy News No. 38, dated March 4, 1957. The second sentence of the last paragraph on the front page should have begun "Although 1955 was regarded as a dry year..." The next sentence should have read, "It is evident that some factor in addition to total rainfall was especially favorable in 1956 and especially unfavorable in 1955."

Mark June 27 on your calendar. That's the date of the First Annual Agronomy Day to be held at Urbana.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 5, 1957

FORAGE SORGHUM SILAGE

No. 41

What to use as a substitute silage crop for corn in the corn allotment program? Some Illinois farmers have been considering forage sorghums as the answer.

Large yields of excellent silage can be obtained with forage sorghums. They have tall, sweet, juicy stalks, but produce relatively little grain in comparison with the grain sorghums. Because of the relatively small amount of grain and a tendency for the grain to pass through cattle undigested, sorghum silage has a somewhat lower feeding value per ton than well-eared corn silage. However, on an acre basis, under dry conditions, forage sorghums will outproduce corn.

What are some of the advantages of sorghum silage?

1. Forage sorghums are resistant to drouth. For this reason they will yield more tons of silage and more total digestible nutrients per acre than corn will in years of below-normal rainfall or on droughty soils.
2. From the standpoint of palatability, forage sorghum silage can be considered to be at least as good as corn silage.
3. Forage sorghums retain the optimum moisture for ensiling over a longer period than corn. Corn is in the proper stage for ensiling for only 7 to 10 days. Sorghums, on the other hand, will remain in the proper stage for 20 to 30 days because the plant stays green until killed by frost. Forage sorghums should not be cut until the grain has reached the "stiff-dough" stage.
4. There is no danger of prussic acid poisoning after forage sorghums have undergone the ensiling processes.
5. Some forage sorghums are reported to be resistant or tolerant to chinch bug injury.

What are some of the disadvantages of sorghum silage?

1. In years of normal or above-normal rainfall, forage sorghums may produce fewer total digestible nutrients per acre than corn, although they usually yield more tons of silage than corn.
2. Sorghum silage has a lower feeding value per ton than corn.
3. There is danger of getting sour silage if forage sorghums are cut before the grain reaches the "stiff-dough" stage.
4. Forage sorghums tend to lodge more than corn.

Cultural practices

Forage sorghums are a warm-weather crop and should not be planted until the end of May or the beginning of June. Seedbed preparation is similar to that for corn. Except for minor changes, such as planting plates, the same planting

(Continued)

equipment can be used as is used for corn. Equipment used in cultivating and harvesting a crop of corn silage can also be used for forage sorghums. In general, forage sorghums have fertility requirements corresponding to those of corn.

The planting rate for forage sorghums is 5 to 8 pounds per acre in 36- to 40-inch rows. Treated, certified seed of an adapted variety should be planted. Uncertified seed is likely to contain a great many impurities, because forage sorghums are not necessarily self-pollinated and often readily cross with other varieties, including Sudangrass and Johnsongrass.

Varieties of forage sorghums

The table below gives the yields of silage of some of the varieties included in five tests conducted in 1956 by the Illinois Agricultural Experiment Station. The number of days from planting to maturity is also shown.

Variety	Carbon- dale T/A ¹ /	Dixon Springs T/A ¹ /	Browns- town T/A ¹ /	Cham- paign T/A ¹ /	DeKalb T/A ¹ /	Average silage T/A ¹ /	Maturity days
Kansas-							
Orange	23.4	18.9	--	25.2	25.4	23.22/	120-130
Atlas	22.0	17.7	24.0	22.6	19.0	21.1	120
Axtell	21.0	18.5	21.0	22.5	20.3	20.7	105-110
Ellis	19.2	--	14.4	16.3	17.0	16.73/	105-110
Rox Orange	19.0	16.8	19.8	20.1	23.6	19.9	105-110
Norkan	18.5	14.8	16.9	23.2	20.4	18.8	100-110
Early Sumac	20.0	14.4	--	22.4	23.6	20.12/	100-105
Corn ⁴ /	16.3	18.1	17.2	18.2	24.5	18.8	

1/ Tons of silage per acre, adjusted to 70 percent moisture.

2/ Does not include Brownstown trials.

3/ Does not include Dixon Springs trials.

4/ A variety considered well adapted for silage was grown at each station.

In southern and central Illinois, taller, late-maturing varieties, such as Atlas, should be used to take advantage of the entire growing season and to get the most silage per acre. In northern Illinois these varieties will not reach the proper stage of maturity for silage, so earlier maturing varieties, such as Norkan, Axtell, and Early Sumac, should be used.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 12, 1957

PUBLICATIONS OF UNIVERSITY OF ILLINOIS
AGRONOMY DEPARTMENT

No. 42

The following list contains some of the most popular Agronomy Department publications of the past few years and also some more recent releases with which you may not be familiar. We present them as a guide to you in obtaining up-to-date information from your Agronomy Department. Order by number (B - bulletin; C - circular; AG - Agronomy mimeograph; SR - Soil Report) and/or title.

- Corn
- B605 1956 Illinois Corn Tests - Variety Performance. 30 p.
 - B606 Experimental Corn Hybrids Tested in 1956. 32 p.
 - AG1645 Recipe for 100-Bushel Corn
 - AG1707 Effects of Planting Rate and Light Intensity on Corn Yields
 - AG1709 Establishing Legumes in Corn
 - AG1718 Breeding Corn Adapted for High Planting Rates

Small Grains and Oil Crops

- B556 Soil-Borne Wheat Mosaic. 35 p.
- C726 Crops for Emergency Plantings. 8 p.
- C754 Spring Oat Varieties for Illinois. 16 p.
- AG1617 Winter Oats - A Crop for Southern Illinois
- AG1639 Oat and Wheat Seed Treatments
- AG1692 The Place of Grain Sorghums in Illinois
- AG1717 1956 Winter Wheat and Rye Variety Trials
- AG1719 1956 Winter Barley Trials
- AG1723 1956 Spring Oat Data
- AG1725 1956 Summary of Illinois Spring Oat Variety Demonstrations
- AG1738 1956 Results From Grain Sorghum Variety Trials in Illinois
- AG1743 Farmers Experience With Grain Sorghum in Illinois in 1956

Legumes and Grasses

- B569 The Clark Soybean for Illinois. 4 p.
- C559 Sweet Clover for Illinois. 24 p.
- C647 Pastures for Illinois. 64 p.
- C649 Better Farming With a Legume-Grass Program. 12 p.
- C650 Ladino Clover in Illinois. 12 p.
- C676 Soybean Diseases in Illinois. 32 p.
- C682 Long-Season Pastures for Illinois. 8 p.
- C703 Five Steps in Pasture Improvement. 16 p.
- C725 Growing Birdsfoot Trefoil in Illinois. 16 p.
- C727 Growing Red Clover in Illinois. 8 p.
- C740 Keeping Southern Illinois Pastures Productive. 12 p.
- C743 How to Make Good Grass-Legume Silage. 6 p.
- C756 Alfalfa. 19 p.
- C760 Five Years of Tests of Soybean Varieties for Illinois. 12 p. (With 1956 supplement)
- AG1713 Effects of Frequency and Dates of Cutting on Dry-Matter Yields of Sudan-Grass Varieties
- AG1716 Effect of 5 Legumes and Grass Species on Performance of Pasture Mixtures
- AG1727 Seeding Mixtures for Soil Bank Acres
- AG1734 1956 Illinois Soybean Variety Demonstration

Weed Control

- C718 Weeds of the North Central States. 239 p. (Charge)
- C771 Chemical Control of Weeds and Brush. 19 p.
- AG1708 Weed Control Studies
- AG1730 Summary of 1956 Illinois Chemical Weed Control Demonstrations

Soils

- B539 Soil Building With Legumes. 16 p. Describes results from Illinois soil experiment field
- B540 Costs and Benefits From Soil Conservation in Northeastern Illinois. 36 p.
- B550 How Valuable Are the Soils of Central Illinois? 36 p. Shows relative values based on farm earnings

(Continued)

Soils (Cont.)

- B577 Yield and Composition of Corn Forage as Influenced by Soil Fertilization. 20 p.
C575 How to Farm on the Contour. 6 p.
C593 Grass or Gullies. 20 p. Tells how to build and maintain grass waterways
C604 Shall We Fall-Plow or Spring-Plow in Northeastern Illinois? 8 p.
C655 Tilth of Corn-Belt Soils Cannot Be Maintained Without Legumes and Grasses. 8 p.
C663 Handling Northeastern Illinois Soils. 16 p.
C667 Protecting Your Soil. 24 p. A brief guide to sound conservation practices.
C721 Limestone--How to Use It, When to Use It, Where to Use It. 12 p.
C724 Soil Treatment Recommendations Based on Soil Tests. 4 p.
C734 Plain Talk About Soil Management. 16 p.
C758 Understanding Soils. 40 p.
C765 Potassium - When to Use It, Where to Use It, How to Use It. 12 p.
SR77 Henderson County Soils. 64 p.
SR78 Lawrence County Soils. 92 p.
AG948 The Morrow Plots
AG1481 Nitrogen for Illinois Corn
AG1562M What's in the Fertilizer Bag
AG1571 Nitrogen Fertilizers - What They Are and How They Act
AG1578 Effect of Cropping Systems on Corn Yields and on Physical Properties of Some Dark-Colored Soils
AG1588 Nitrogen Recommendations
AG1699 Sixteen Years of Soil Improvement at Brownstown Experiment Station
AG1705 Effect of Nitrogen Fertilizer and Legume Catch Crops Used With a Rotation
AG1710 Northern Illinois Experiment Field
AG1711 Nitrogen Composition of Grain and Stover From Nitrogen Soil Test Locations, 1955
AG1712 Winter Application of Nitrogen Fertilizer
AG1729 Fertilizer, Fertilizer Materials and Rock Phosphates Sold in Illinois, 1-1-56 to 7-30-56
AG1732 Five Suggested Plans for Simple Fertility Demonstrations
AG1733 What the Soil Tests Tell You

General

- Agronomy News. Timely releases of current agronomic research results
Agronomy Facts, Vol. 1, Vol. 2, and Vol. 3 (Charge). Compilation of brief articles on pertinent agronomic topics
Crop Varieties for Illinois (chart 32" x 21")
C766 Managing Soil Bank Acres. 15 p.
AG1737 Graduate Study in Agronomy. Brochure for prospective students

For topics not covered here or for more specific information, write to the University of Illinois College of Agriculture, Urbana, Illinois. Also watch the Agronomy News for the latest publications of your Agronomy Department and, if possible, tune in to WILL, the University of Illinois Station, for agronomy topics to be heard Monday of each week from 12:15 to 1:00 p.m. on the Illinois Farm Hour.

June 27 is a day to remember - First Annual Agronomy Day

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AGRONOMY

CROPS AND SOILS

DEPARTMENT
OF AGRICULTURE

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 19, 1957

MINIMUM TILLAGE FOR CORN

No. 43

Are all these trips necessary? Many farmers in Illinois and other states have been asking this question when they consider the conventional method of preparing a seedbed for corn. Minimum tillage is the practice of reducing the number of tillage operations in corn production.

Here are some minimum-tillage methods that you may be interested in trying in 1957:

1. In the wheel-track planting method, the field is plowed just before planting. The furrow slice is not allowed to dry out and become hard, and rain can't intervene before planting. The corn row is placed directly in the tractor wheel tracks, which provide a good, firm seedbed, by adjusting the rear wheels to 40 to 44 inches. If this is not possible, two or four special wheels can be mounted on the cultivator frame at 40-inch spacing to provide pressure to compact the soil around the seed. To make the special wheels, weld shanks to the hub of a rubber-tired auto wheel.
2. The plow-plant method is an extreme in minimum tillage. Plowing, planting, and fertilizing can be accomplished in one trip over the field. With a 3-bottom, 14-inch plow one row of corn is planted at a time with 40 to 42 inches between rows. For two-row planting a 5- or 6-bottom plow is needed.
3. In the plow-level-plant method, the field is plowed at planting time with a light tillage machine pulled behind the plow to level and pack the soil. This method is suitable for a four-row planter.
4. In the cultivator-planting method, plowed soil is tilled and corn is planted in one trip over the field. Using the tractor cultivator with the sweeps adjusted to till all the area at planting time knocks out the weeds.
5. There are other ways to reduce tillage operations. Often the extra disking on fall-plowed and early-spring-plowed fields can be eliminated. When spring plowing, instead of using a harrow, pull a section of rotary hoe backwards behind the plow.

Now let's look at some of the advantages of minimum tillage:

1. Production costs are lowered because fewer trips are made over the field. It is estimated that each trip that can be eliminated means a saving of about \$1.00 an acre.
2. Fewer trips with heavy wheel tractors mean that soil packing, and subsequent loss of soil tilth, is reduced. In the conventional method--plow, disk once or twice, harrow, and plant--at least four trips are made over the field, and often more. The total may reach 10 or 11 by the time rotary hoeing, weed spraying, and several cultivations are performed. Under proper soil conditions, seedbed preparation can be reduced to one or two trips over the field.
3. Because the surface of the soil is left loose and open, the rate at which water enters the soil is increased. This means more water for the crops during periods of little rainfall.

4. Soil erosion is reduced because there is less runoff. The rough, uneven surface makes a barrier against wind and water erosion.
5. Weeds are reduced because the soil surface is too loose for annuals to germinate and broken rootstocks of perennials lose contact with the soil and often dry out and die. In many fields weeds can be controlled by spraying and one cultivation.
6. The number of cultivations can be reduced. With fewer weeds the first cultivation can be delayed until the corn is taller than normal. Cultivating can then be done at a faster than normal speed without covering up the corn.

Minimum-tillage methods also have limitations:

1. Plowing is delayed until planting time in most methods. This means that the planting rate is determined by the rate at which you plow, making it too slow for large acreages. Also, delayed plowing of sod may seriously dry out the soil to rooting depth in a dry year.
2. A good job of plowing is essential to pulverize the soil and bury all trash. Weeds must be completely turned under to prevent their regrowth.
3. The soil must be in good tilth; a good seedbed must be prepared in the immediate vicinity of the seed. With minimum tillage it may be especially difficult to get a good seedbed on heavy, sticky, or drouthy soils.

In 1956, tests conducted by Agronomy Department research workers in cooperation with the Department of Agricultural Engineering showed that minimum-tillage methods under proper soil condition can produce yields about equal to the conventional method. A good way to find out whether reduced tillage will pay on your farm is to try it on just a few acres next to an area planted in the conventional way. Yields from both methods should be weighed because it is difficult to see differences of even 10 bushels an acre.

Perhaps all those trips aren't necessary!

Correction in Previous Issue

The address to which insect-damaged crop plant specimens may be sent as given in the Agronomy News No. 40 dated March 25, 1957, is incorrect. The correct address is Dr. H. B. Petty, Extension Entomologist, 280 Natural Resources Building, University of Illinois, Urbana, Illinois.

JUNE 27 IS AGRONOMY DAY AT URBANA.

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NEWS

DEPARTMENT OF AGRICULTURE

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URBANA

April 25, 1957

SOYBEAN VARIETIES FOR ILLINOIS

No. 44

The use of high-yielding, adapted varieties is essential for profitable soybean production. Because the length of growing season varies greatly from northern to southern Illinois, state-wide use of most varieties is limited.

These Varieties Are Recommended for Use in Illinois (arranged from earliest to latest):

Northern Illinois

Central Illinois

Southern Illinois

Chippewa
Blackhawk
Harosoy
Hawkeye
Adams

Harosoy
Hawkeye
Adams
Lincoln
Clark

Adams
Lincoln
Clark
Wabash
Perry

Chippewa is a very early variety that was recently added to the recommended list. It matures five days earlier and is two inches shorter than Blackhawk. Chippewa has yielded well in trials in northern Illinois and has good standability. Certified seed of this variety is not available in Illinois this year.

Blackhawk matures three days before Harosoy and six days before Hawkeye. It yields relatively well in the extreme northern part of the state and has good resistance to lodging and a high oil content.

Harosoy is a high-yielding variety that matures three days earlier and generally shatters less than Hawkeye. In many trials across the northern half of the state, Harosoy has had the highest yield of any variety, and in central Illinois it is often used to precede winter wheat.

Hawkeye is highly recommended for the northern two-thirds of Illinois and is the leading variety in terms of total acreage in the state. Because of its excellent resistance to lodging, it combines well.

Adams generally matures three days later and grows two inches taller than Hawkeye. This variety is recommended for the central two-thirds of the state and is used extensively in south-central Illinois to precede winter wheat. Its resistance to lodging is somewhat poorer than that of Hawkeye, and the seed cracks or splits easily during combining, but it often outyields Hawkeye, especially on lighter soils in central Illinois.

Lincoln matures three days later than Adams and six days later than Hawkeye. It was formerly the leading variety in the state; and although its popularity has declined, it is still a suitable variety for central and southern Illinois.

(Continued)

Clark matures six days later, is more resistant to lodging, and is higher yielding than Lincoln. It is two inches taller than Hawkeye and stands almost as well. Clark has the highest average five-year yield record of any variety in southern Illinois trials, and it may soon occupy most of the soybean acreage in that part of the state. Even as far north as Champaign County, it will outyield Lincoln if planted early.

Wabash matures one day later and is three inches taller than Clark, but Clark has more resistance to lodging, higher oil content, and higher yields. For this reason, Clark should replace it, but Wabash is still recommended for the southern one-fourth of the state.

Perry is the latest maturing variety recommended for Illinois. It usually matures six days later than Clark and over two weeks later than Hawkeye. This variety is too late-maturing to precede winter wheat except in the extreme southern part of Illinois, and it does not yield as well as Clark.

What Is the Seed Outlook for This Year?

Germination tests of seed samples of recommended varieties conducted by the Illinois Crop Improvement Association show that germination of seed available this year will in general be good. In some samples germination was low because of seed-coat damage caused by weathering during the harvest season. Seeds were also broken or damaged by running the cylinders too fast during combining.

Your Agronomy Department advises using certified seed of a variety recommended for your region of the state at a rate of 50 to 70 pounds of seed an acre. Before planting, inoculate the seed with a suitable strain of nitrogen-fixing bacteria.

For further information on soybean varieties and yields, consult Circular 760, "Five Years of Test of Soybean Varieties for Illinois." This circular can be obtained by writing to the Information Office, College of Agriculture, University of Illinois, Urbana, Illinois.

PLAN TO ATTEND AGRONOMY DAY JUNE 27 AT URBANA.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 30, 1957

WATER-SOLUBLE PHOSPHORUS IN FERTILIZERS

No. 45

The problem of water-solubility of phosphorus is receiving increasing attention. In normal and concentrated superphosphates the phosphorus component has high water-solubility. As long as fertilizers consisted of physical mixtures of superphosphate and nitrogen and potassium salts, there was no question about the optimum water-solubility of phosphorus. Recent developments in fertilizer technology, however, have reduced the water-solubility of phosphorus in many fertilizers.

Present fertilizer laws do not require a statement of the amount of water-soluble phosphorus in a fertilizer; the availability of phosphorus is reported officially in terms of citrate solubility. Although the water-solubility of the phosphorus in the more common phosphate fertilizers, such as those in the table below, is quite well known, the water-soluble phosphorus content of many commercial mixed fertilizers is generally not known except to the manufacturer. In "blended fertilizers," which are physical mixtures of nitrogen, potash, and superphosphate materials, the water-solubility of phosphorus is still considered to be satisfactory. The data in the table show that a person cannot tell how much water-soluble phosphorus a fertilizer contains just by looking at the guaranteed total available P_2O_5 shown on the tag.

Solubility Characteristics of Some Common Processed Phosphate Materials

Material	Total percent P_2O_5	Percent water- soluble	Percent citrate- soluble	Total percent available
Ammonium phosphate (11-48-0)	49.3	89	9	98
Ammonium phosphate (16-20-0)	21.1	86	12	98
20% superphosphate (0-20-0)	20.5	78	18	96
Triple superphosphate (0-47-0)	46.9	84	13	97
Dicalcium phosphate	40.4	5	91	96
Calcium metaphosphate	64.6	4	93	97

What researchers have found out about water-soluble phosphorus in fertilizers

1. When small amounts of a phosphate fertilizer are band applied to corn or small grains on soils that are low in available phosphorus, the water-solubility of the phosphorus becomes rather important. In such cases the water-solubility of the phosphorus should be at least 50 percent if maximum growth stimulation and yield increases are to be obtained. On the other hand, phosphate water-solubility in excess of 50 percent gives no further yield increase.
2. When applications of a phosphate fertilizer are broadcast on acid to neutral soils that are low in available phosphorus, water-solubility of the phosphorus becomes less important than when band application is made. In tests with oats, very similar yields were obtained by using phosphates varying from 4 to 100 percent in water-solubility.

3. When phosphate fertilizers are applied on calcareous soils (pH 7.0 or higher) that are deficient in available phosphorus, high water-solubility of the phosphorus is important whether the fertilizer is banded or broadcast. Tests have shown that phosphates having a water-solubility of 92 to 100 percent give significantly higher oat yields than phosphates of low water-solubility.
4. High water-solubility does not mean that such phosphates are easily leached from the soil in drainage water. In fact, soluble phosphorus reacts almost immediately with clay and organic matter particles in the soil to give non-leachable but plant-available soil phosphorus forms.
5. The high value of phosphate water-solubility, especially in band applications on soils that are deficient in available phosphorus, has only a single-year effect. When carry-over effects are compared, second-year yield increases can be expected to be similar from equivalent applications of phosphorus of high and low water-solubility.
6. The importance of phosphate water-solubility on soils testing slight, medium, or high in available phosphorus has not been studied. However, one might expect that on soils having a phosphorus test of S+ or better a fertilizer of low water-solubility would not be greatly inferior, even for starter purposes, to a fertilizer with a much higher water-soluble phosphorus content.

How important is water-solubility when choosing processed phosphate fertilizers

High water-solubility of the phosphorus in a fertilizer has little or no effect on yields when broadcast applications are made on acid to neutral soils that are low in available phosphorus. Nor does it influence the carry-over effects of the fertilizer on the second-year yields. In addition, on soils testing slight, medium, or high in available phosphorus, it is probable that the water-solubility of a phosphate fertilizer is not important.

However, research results indicate that high water-solubility in phosphate fertilizer is important under these conditions:

1. When small amounts of phosphorus are band-applied to corn or small grains on soils that are low in available phosphorus.
2. When either broadcast or band applications are made on calcareous soils that are low in available phosphorus.

Soil conditions and method of application will determine how much importance to place on the water-solubility of phosphate fertilizers used on your farm.

MAKE A DATE TO ATTEND AGRONOMY DAY JUNE 27.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 3, 1957

AGRONOMY EVENTS

No. 46

Experiment Field Meetings

<u>Date</u>	<u>Field</u>	<u>County</u>
May 9	Brownstown	Fayette
May 27	Enfield	White
May 28	Ewing	Franklin
May 29	Toledo	Cumberland
June 3	Raleigh	Saline
June 4	West Salem	Edwards
June 4	Carbondale	Jackson
June 10	Newton	Jasper
June 11	Carlinville	Macoupin
June 12	Hartsburg	Logan
June 13	Minonk	Woodford
June 14	McNabb	Marshall-Putnam
June 18	Carthage	Hancock
June 19	Aledo	Mercer
June 20	Dixon	Lee
July 11	DeKalb	DeKalb
August 23	Oblong	Crawford
August 29	Newton	Jasper
September 4	Brownstown	Fayette
September 6	Toledo	Cumberland
September 9	Clayton	Adams
September 10	Oquawka	Henderson
September 11	Kewanee	Henry
September 12	Lebanon	St. Clair
September 13	Carbondale	Jackson
September 17	Dixon	Lee
September 18	Mt. Morris	Ogle
September 19	Elwood and Joliet	Will

(Continued)

Other Events

<u>Date</u>	<u>Event</u>	<u>Place</u>
June 5-7	Farm Advisers' Conference	Urbana
June 11-13	Vocational Agriculture Teachers Conference	Urbana
June 18-19	F.F.A. State Judging Contest	Urbana
June 25	Annual Meeting, Illinois Crop Improvement Association	Urbana
June 26	Annual Field Day, Illinois Seed Dealers and Illinois Crop Improvement Association	Urbana
June 27	Annual Agronomy Day for Farmers	Urbana
July 1	State 4-H Judging Contest	Urbana
August 9-18	Illinois State Fair	Springfield
August 20	State F.F.A. Livestock, Grain, Meat, and Milk Contest Finals	Urbana
September 10	Annual Field Day, Illinois Seed Producers Association	Urbana

New Publications

C 771 - Chemical Control of Weeds and Brush: supersedes Circular 742
C 774 - Grain Sorghums in Illinois

Agronomy Day

In past years the College of Agriculture has held Open House during the summer months for farmers and others interested in agriculture. This year, however, there will be no Open House. In order that you may see agronomic research in progress, your Agronomy Department is holding its first annual Agronomy Day on June 27. Plans are being made for conducted tours of the Agronomy South Farm at Urbana. Members of the research staff will be on hand to show you many of the phases of study and tell you about them. Corn breeding, small grain varieties and diseases, soybean varieties and diseases, forage and pasture species, weed control, and rotation and fertility studies are some of the research projects you can see on Agronomy Day. The tours will start about 10 o'clock on June 27. Plan to attend.

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AGRONOMY

CROPS AND SOILS

DEPARTMENT
OF FORESTRY

NEWS

COLLEGE OF AGRICULTURE

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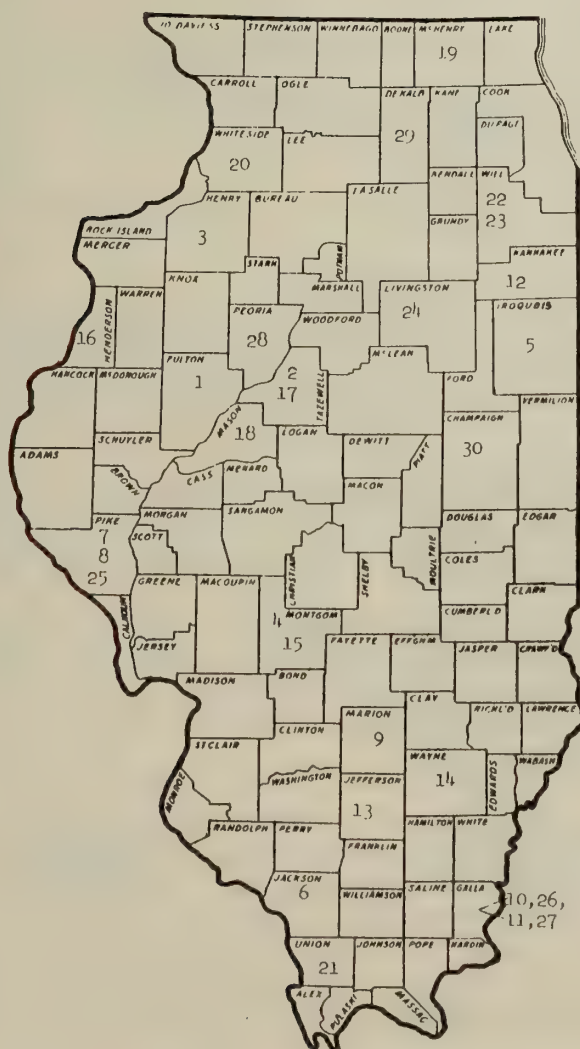
URBANA

May 10, 1957

THE SOIL MOISTURE SITUATION IN ILLINOIS

No. 47

The following map shows the sample sites of a soil moisture sampling conducted during the week of April 15-19. The results of this survey are shown in Table 1.



In contrast with last season, this year's results show the soil moisture situation to be excellent at the time of sampling. There has been some rainfall since the time of sampling so that the state as a whole has no areas where subsoil moisture is deficient. Most areas have reported that tile is flowing, which is also a good indicator of subsoil recharge. In view of the high moisture levels, close attention should be given to all drainage systems to insure adequate discharge of water from the land.

Table 1. Results of soil moisture sampling

Location of sample	Soil type	Inches of available water in upper 51 inches of soil	
		Normal	This sample
1	Clinton silt loam	13.6	9.6
2	Sumner fine sandy loam	2.9	7.0
3	Fayette silt loam	11.8	8.5
4	Cowden silt loam	11.5	10.5
5	Ashkum silt loam	8.9	8.7
6	Menfro silt loam	13.0	10.5
7	Herrick silt loam	12.4	9.3
8	Clary silt loam	12.0	8.5
9	Cisne silt loam	12.2	11.0
10	Patton silty clay loam No. 465	9.8	8.9
11	Bonpas silty clay No. 129	10.1	9.5
12	Watseka loamy fine sand	2.1	3.2
13	Bluford silt loam	16.0	14.7
14	Bonnie silt loam	15.7	13.6
15	Herrick silt loam	10.6	9.3
16	Huntsville silt loam No. 77	10.8	11.5
17	Muscatine silt loam	9.8	7.6
18	Onarga fine sandy loam	6.4	7.1
19	Ringwood silt loam	7.2	4.0
20	Sawmill silty clay loam	6.6	6.4
21	Tice silty clay loam	11.5	8.1
22	Drummer silty clay loam	10.0	4.0
23	Ashkum silty clay loam	9.8	8.0
24	Swygert silt loam	7.7	6.3
25	Clary silt loam	11.6	9.3
26	Patton silty clay loam	10.9	10.4
27	Bonpas silty clay loam	9.1	9.0
28	Tama silt loam	11.4	8.5
29	Saybrook silt loam	8.8	8.2
30	Sidell silt loam	10.6	8.7

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

MAY 21 1957
May 16, 1957

PASTURE MANAGEMENT

No. 48

Good pasture is the cheapest source of nutrients for livestock. In addition, it saves labor, water, and soil and improves soil tilth. If pastured at the right stage of maturity, it provides high-quality roughage with an almost ideal protein content.

Good pasture doesn't just happen. It is the result of establishing good stands of pasture forages and good management. Good management is essential to obtaining uniformly high yields of palatable and nutritious forage throughout the entire grazing season. Here are some do's and don'ts of good pasture management:

DO have a full-season pasture plan. On many Illinois farms such a plan might include:

1. Improved permanent pastures, which remain several to many years on land that has had proper soil treatment as indicated by soil tests, has had the old sod thoroughly torn up (plowed if possible), and has been seeded to a mixture of long-living adapted legumes and grasses. They are most productive during the spring and early summer.
2. Rotation pastures, which are part of a regular rotation that calls for pasture one or more years in the rotation. Mixtures of tall-growing grasses and legumes can be used for grazing during midsummer and early fall.
3. Temporary pastures (also known as supplemental or emergency pastures), which are used during periods when production of other forms of pasture is low. Sudangrass is often used to provide mid- and late-summer grazing; and winter rye, as well as other small grains, is often used for early-spring and late-fall grazing.

A sound pasture plan calls for a reserve of unused forage at all times to meet such emergencies as severe winters, partial crop failure, or drought. This reserve can be in the form of hay, grass silage, or unused pasture. Most farmers have a surplus of pasture in the spring, and many use the first growth of rotation pastures to make grass silage or hay. Cutting this extra forage when the legume is in the early- to medium-bloom stage can provide palatable, nutritious silage or hay for use in late summer or for winter feeding.

DO maintain soil fertility. Pasture, like all other crops, requires nutrients from the soil for growth. Even though the soil was well fertilized prior to seeding, it is necessary to apply maintenance amounts of fertilizer from time to time to keep the fertility level up. Potash and phosphorus fertilizers should be top-dressed every year, or at least every two years, to keep good legume-grass mixtures productive. Amounts to apply should be based on soil test results. The best time to apply is in the fall or spring. Summer applications, when growth of pasture plants has slowed down, will stimulate weed growth more than the pasture. Small yearly applications of potash are better than larger, less frequent applications because if large amounts are present the pasture plants will take up more potassium than they actually require.

Nitrogen fertilizers are not generally recommended for good legume-grass mixtures because they tend to stimulate the grass, which then crowds out the legumes. However, on pure grass pastures or older legume-grass mixtures where the legumes have been eliminated, nitrogen applications will often increase production. Spring applications of 40 to 60 pounds of nitrogen an acre are best.

Nitrogen applications are also beneficial to early production of unimproved permanent pasture. Yields can be doubled and the protein content significantly increased by applying 40 to 80 pounds of nitrogen an acre in early March. For better distribution of yield response, apply 40 pounds of nitrogen an acre in early March and again in early April. The unimproved pasture will be ready to graze 10 days sooner than normally and will provide early-season pasture until regular pasture is ready to use.

DON'T graze continuously. Continuous grazing reduces total yields and shortens the life of tall-growing grasses and legumes. Instead, practice rotational grazing by dividing pastures into at least two or three fields so that one can be grazed while the others are recovering and making new growth. In this way young, palatable, nutritious herbage will be available all through the season. Pasture plants in the vegetative stage have a high protein content, which decreases steadily with maturity. Grasses in the boot stage may contain as much as 20 percent protein, while the same grasses at full head will contain only 13 percent.

DO clip after grazing. When animals are changed from one pasture to another, there will still be uneaten forage and weeds in the grazed pasture. Clipping or mowing this uneaten herbage will improve the quality and quantity of future forage and help to eliminate weeds if it is done before they set seed.

DON'T graze too late in the fall or too early in the spring. Alfalfa pastures should not be grazed from September 7 to October 20, because this period is required to build up food reserves for the next season's growth. Most pastures should not be grazed in the spring until they have grown to a height of 4 to 6 inches. This early growth is made at the expense of stored food reserves, which should be built up again before grazing occurs.

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MAY 24 1957

AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 22, 1957

SUDANGRASS VARIETIES FOR ILLINOIS

No. 49

There are two main classes of Sudangrass. Some have sweet and juicy stalks, while others are non-sweet and relatively dry-stalked. The sweet types have higher palatability, even in later stages of growth, and are generally more readily eaten when pastured, than the non-sweet types. The dry-stalked varieties, on the other hand, are usually higher yielding and more easily cured for hay. The data in the table give the yields of some Sudangrass varieties at various locations in the state.

Average Yields in Sudangrass Variety Trials, 1954-1956
Urbana, Brownstown, and Carbondale Experiment Fields

Variety	Yields adjusted to 12% moisture		
	Urbana T/A1/	Brownstown T/A2/	Carbondale T/A3/
Piper	5.82	2.74	3.57
Sweet	4.71	2.53	2.81
Greenleaf	5.07	2.37	3.03
Common	5.07	2.72	3.15
Lahoma	4.50	2.37	3.07

1/ Two cuttings in 1954; three cuttings in 1955 and 1956.

2/ Two cuttings in 1954 and 1956; one cutting in 1955 (because of dry weather growth was insufficient for second cutting).

3/ Three cuttings in 1954; one cutting in 1955 (because of dry weather growth was insufficient for second cutting); two cuttings in 1956.

Varieties Recommended in Illinois

Piper is a relatively dry-stalked variety that was developed by the Wisconsin Experiment Station. In variety tests conducted in Illinois, it has the highest average three-year yield record of any variety tested. It has a lower prussic acid potential than most other varieties and has above-average resistance to leaf diseases, which sometimes seriously reduce Sudangrass yields. The seed and foliage of Piper are somewhat variable in color. Certified seed is available in Illinois.

Sweet Sudangrass is a juicy-stalked variety that was developed in Texas. In Illinois its performance has been good, and high-quality certified seed is available. Damage due to leaf diseases on Sweet varies a great deal, depending on the location and the year. However, this variety seems to have more resistance to chinch bugs than do the dry-stalked varieties. Sweet, which has reddish brown seeds, matures about two to four days later than Piper.

Greenleaf is a relatively new juicy-stalked variety that has recently been added to the recommended list. It was released by the Kansas Experiment Station. Like Piper, it has a low prussic acid potential. Tests so far show it to have a high degree of leafiness and high resistance to leaf diseases. Certified seed is available. Greenleaf has uniformly mahogany-colored seeds and matures two weeks later than Piper.

Some Varieties Not Recommended in Illinois

Common is a dry-stalked variety that yields quite well in Illinois, but it is not recommended because of its extremely early maturity and susceptibility to leaf diseases.

Lahoma is a sweet Sudan that was developed in Oklahoma. In tests there it has shown uniformity, good leafiness, palatability, and greater resistance to leaf diseases and later maturity than other sweet Sudans. This variety has not yielded well at Urbana and Brownstown, but it may be more adapted to the southern part of the state. Lahoma needs to be tested further before it can be fully evaluated.

Cultural Practices

Sudangrass is a warm-weather crop. It should not be planted before late May or early June. In central and southern Illinois, it can be planted as late as August 1. Certified seed, drilled or broadcast at the rate of 20 to 25 pounds an acre on a well-prepared seedbed, usually gives the best results. If other nutrients are adequate and the preceding crop was not a legume, applications of 30 to 50 pounds of nitrogen an acre may increase yields. However, if other nutrients are low, high applications of nitrogen may not greatly increase yield and may increase the prussic acid potential.

The danger of prussic acid poisoning may be reduced by:

1. Using only certified seed or seed that is known to be pure Sudan.
2. Letting the plants grow to a height of at least 18 inches before grazing. They will usually reach that height four to six weeks after planting.
3. Practicing rotational grazing and letting the plants grow to at least 18 inches before regrazing.
4. Not turning excessively hungry cattle onto Sudangrass pastures.
5. Not grazing frosted or drought-stunted Sudangrass forage.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 24, 1957

DELAYED PLANTING OF CORN AND SOYBEANS

No. 50

A recent issue of Agronomy News presented a picture of excellent subsoil moisture throughout most of Illinois. However, additional amounts of precipitation in many areas have caused a delay in planting corn and soybeans. How serious is this delay? Should farmers who have not yet planted switch to earlier maturing hybrids and varieties?

Here is what your Agronomy Department advises:

Depending on the area of the state, corn planting can be delayed until as late as June 5 to 15 before substantial yield reductions and danger of having to harvest soft corn will justify changing to an earlier maturing hybrid.

Planting of soybeans can also be delayed until as late as June 10 to 15, depending on the area, before potential yield reduction warrants switching to an earlier maturing variety.

Why is this so?

Unless you ordinarily use a corn hybrid that is late maturing in your section, there is no need to worry about switching to an earlier maturing hybrid for some time yet. A shift from a full-season adapted hybrid to an earlier maturing hybrid usually means a large decrease in yield. It is true that a full-season adapted hybrid will not yield so well when planted in early June as when planted in early or mid-May, but it will still yield more than an early-maturing hybrid planted in early June.

In the northern section of the state and as far south as DeKalb, the regularly used full-season adapted hybrids will yield more than early-maturing hybrids when planted in early June. However, after June 5 to 10, the danger of having soft corn at harvest time is great enough to favor switching from a full-season hybrid to an earlier hybrid.

The same basic facts apply in other sections of the state. However, because the growing season is longer, planting can be delayed even longer further south. In the region from DeKalb to 75 miles south of DeKalb, planting of full-season adapted hybrids may be delayed until as late as June 10; in central Illinois, until June 10 to 15; and in the southern third of the state, until even later, with little danger of soft corn.

Only if continued poor weather prevents planting before these dates will a change from full-season adapted hybrids to earlier hybrids be justified. However, farmers who have been raising hybrids that are later than those ordinarily recommended in their area may want to make the switch somewhat earlier.

If it is necessary to make this shift, select a good hybrid that is adapted to the area 50 to 75 miles north of the area where it is to be grown. You can get this information from your farm adviser or your hybrid corn salesman or from Illinois Agricultural Experiment Station Bulletin 605, "1956 Illinois Corn Tests." This circular is available from your farm adviser or Agronomy Department.

Soybeans

In general, what has been said about corn is also true of soybeans. Full-season varieties yield less when planted in early June than in early or mid-May, but they still yield more than earlier maturing varieties planted in early June. Also, the further south, the longer planting of a full-season variety can be delayed before there is danger that it will not mature by harvest time.

In the northern quarter of Illinois, Hawkeye can be planted as late as June 1, and Harosoy as late as June 10. After that date Chippewa, a recently recommended very early maturing variety, is suggested.

In the next most northern quarter, Hawkeye and Adams can be planted as late as June 15. Harosoy and Chippewa are suggested if planting is delayed beyond June 15. The shift might be made somewhat sooner if a variety like Lincoln is ordinarily grown.

In central Illinois Clark can be planted as late as June 1, and Lincoln as late as June 15. After that date a switch to Harosoy or Hawkeye is suggested. Very early varieties like Chippewa should not be used unless planting is delayed until very much later.

In the southern third, there is little chance that it will be necessary to switch to varieties maturing earlier than those commonly grown in that region.

ATTEND AGRONOMY DAY, JUNE 27, AT URBANA.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

June 3, 1957

SEE CROPS AND SOILS RESEARCH IN ACTION

No. 51

Your Agronomy Department invites you to see crops and soils research in progress!

The occasion - First Annual Agronomy Day

The day - June 27, 1957

The time - 10:00 a.m., DST

The place - Agronomy South Farm at Urbana

In past years the College of Agriculture has held Open House during the summer months for farmers and others interested in agriculture. This year, however, there will be no Open House. In order that you may see agronomic research in progress, your Agronomy Department is holding its first annual Agronomy Day on June 27. Members of the research staff will be on hand to show you many of the phases of crops and soils research and tell you about them.

Here are just a few of the things you will see and hear about:

How dwarf corn hybrids may affect Illinois farmers.

How varieties of soybeans are developed and tested.

How "chemical nurse crops" may improve forage seedings.

What lime can do to yields of corn and other crops.

How new and better oat, wheat and barley varieties are developed.

How band placement of seed and fertilizer affects stand establishment and yields of forage.

Tours of the Agronomy South Farm will start about 10:00 a.m. and continue until mid-afternoon. There will be three separate tours of the farm. Each will last about one hour and fifteen minutes. You will have the choice of attending one, two, or all three tours which will be running continuously throughout the day. See the program on the next page for a complete schedule of the tours.

In addition to the tours, plans are being made to have Dr. David D. Henry, President of the University of Illinois, and Dr. Louis B. Howard, Dean of the College of Agriculture, address the group during the noon-hour activities. If you like, bring your own lunch and make it a picnic affair with your friends and neighbors. Light refreshments, including soft drinks, milk and ice cream, will be available on the grounds.

Make plans now to attend and spend June 27 at the Agronomy South Farm. It will be an interesting and worthwhile investment of your time.

Agronomy Day Program - June 27, 1957

Tour One

Speaker

Wheat Breeding and Diseases
Oat Breeding and Diseases
Corn Breeding

W. M. Bever
R. M. Endo
E. R. Leng, D. E. Alexander

Soybean Variety Trials
Soybean Diseases
Red Clover Nursery

R. L. Bernard
D. W. Chamberlain
P. W. Watkins

Tour Two

Nitrogen Recovery
Alfalfa Variety Trials
Weedicide Screening

L. T. Kurtz
C. N. Hittle
F. W. Slife

Pasture Mixture Studies
Wheat Varieties
Oat Varieties

J. A. Jackobs
R. O. Weibel
C. M. Brown

Tour Three

Rotations and Soil Treatment
Water Use by Corn
Cultural Experiments With Grain Sorghums

A. L. Lang
M. B. Russell
J. W. Pendleton

Herbicides on Alfalfa
Band Placement
Minimum Tillage

R. L. Gantz
S. G. Carmer
Wendell Bowers

Registration and tours begin at 10 a.m., Daylight Saving Time - lunch and guest speakers from noon to 1:30 p.m.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

June 11, 1957

POST-EMERGENCE WEED CONTROL WITH 2,4-D

No. 52

Heavy rainfall this past spring means that Illinois farmers may have a bumper crop of weeds in their corn and other row crops this year. The weeds may appear in spite of good seedbed preparation and other cultural practices, especially in fields that were not sprayed with pre-emergence herbicides at planting time. What can be done to reduce weeds after row crops are up?

Post-Emergence Weed Control in Corn

Use normal cultivation practices. However, if you cannot control the weeds by cultivation alone, try post-emergence sprays. Be careful in applying these sprays, as they can injure growing corn. You can minimize the chances of injury by using nozzle extensions to confine the spray to the soil and base of the plants and by using proper nozzle tips and maintaining correct pressures to apply the spray at the proper rate. To reduce drift, maintain a pressure of 30 to 40 pounds per square inch.

2,4-D will control susceptible broad-leaved weeds, but it will not affect annual grasses. Until the corn is three or four feet tall, apply no more than 1/4 pound of the ester form of 2,4-D or 1/2 pound of the amine form per acre. For taller corn, you can increase the rate if you use the proper nozzle extensions and apply the spray at the base of the corn and to the soil.

If you expect a dense growth of weeds after the last cultivation, follow with an application of 1 pound of 2,4-D acid. To prevent injuring the corn, use a boom extension and apply directly to the soil. Do not spray corn with 2,4-D from the time it starts to tassel until after the kernels reach the soft dough stage.

Spraying with 2,4-D can cause stalk brittleness. It is most likely to occur when spraying is done after daytime temperatures of 85° F. and higher. It is usually most serious when the corn is growing rapidly. If a storm occurs or the soil is cultivated before the brittleness disappears, stalk breakage may be serious. This danger can be minimized by applying no more than recommended amounts and using low-volatile esters of 2,4-D when field temperatures exceed 85° F.

Post-Emergence Weed Control in Sorghums

Use good cultural practices to control weeds in sorghums after the crop is up. Apply 2,4-D only as an emergency measure. For post-emergence applications, do not use more than 1/4 pound of the ester type or 1/2 pound of the amine type per acre.

Sorghums are most tolerant to 2,4-D in the 4- to 12-inch stage of growth. The same spray precautions used to control weeds in corn apply to the use of 2,4-D in sorghums.

Post-Emergence Weed Control in Soybeans

Use good cultural practices. However, if you cannot control weeds in problem areas and river-bottom fields by cultivation, use a post-emergence spray. Soybeans are much more susceptible than most other crops to severe injury from herbicides. It is therefore essential to follow suggested rates, methods, and timing exactly. Otherwise crops may be severely injured.

Extremely light rates of 2,4-D will control certain weeds in soybeans. Two ounces of the amine type of acid per acre, applied when the soybeans are two to six inches tall, will control cocklebur, ragweed, pigweed, and annual morning glory without damaging the crop. This rate will not always kill velvetweed, Jimson weed, and smartweed, but it will usually stunt these weeds so that cultivation will destroy many of them.

If you use this method, spray just a few acres for a year or more so that you can become more proficient in applying light rates.

Clean spray equipment and metal tanks thoroughly after using 2,4-D to prevent contaminating other spray materials. Here is a method that will minimize the chances of contaminating other sprays used on susceptible crops:

1. Remove nozzles and drops from the boom and scrub thoroughly with kerosene.
2. Add a box of non-sudsing detergent to 30 or 40 gallons of water. Run this mixture through the pump and by-pass for five minutes and then out through the boom.
3. Partly fill the tank with a solution of 1 to 2 percent household ammonia. This amounts to 1 or 2 quarts in 25 gallons of water, or 2 teaspoons in a quart of water. Leave this solution in the sprayer, including hoses and boom, overnight and then rinse it out thoroughly with clear water.

For more information on specific weed chemicals, weeds, and methods of adjusting spray equipment, consult Circular 771, Chemical Control of Weeds and Brush, available on request from your farm adviser or the Department of Agronomy, Urbana, Illinois.

ATTEND AGRONOMY DAY AT URBANA JUNE 27.

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JUN 28 1957

June 19, 1957

EMERGENCY CROPS FOR SOUTHERN ILLINOIS

No. 53

This issue of Agronomy News is primarily for the area south of U. S. Route 40. In that area many fields have been too wet to plant crops at the normal time, and some bottomlands are reported to be still under water. After June 20 to 25 it will be too late to plant normal full-season corn and soybean varieties. The latter date is for extreme southern Illinois.

Farmers in this situation have several alternatives

1. Early-maturing corn hybrids adapted to northern Illinois can be planted up to July 1 in southern Illinois. Yields will probably be lower, however, than those normally obtained when regularly adapted hybrids are planted on time. The grain will have a higher than normal moisture content but should be mature enough to escape frost damage unless we have an early frost. Even in the event of an early frost the corn can be salvaged as silage. If you are interested only in silage, you can plant early hybrids a little later than July 1.
2. Normal full-season soybean varieties can be planted up to June 20 to 25. After that date, switch to early-maturing varieties like Blackhawk and Harosoy. These can be planted until July 10 to 15. Like corn, the yields will probably be lower than those of normal varieties planted on time.
3. Early-maturing grain sorghum varieties can be planted as late as July 10 to 15. Norghum and Reliance are combine types that mature in 75 to 90 days. You can get higher yields by using a hybrid RS501 (Neb. 5) if seed is available.

Use only treated certified seed, and plant 4 to 6 pounds an acre. Special sorghum planter plates or small-holed bean or popcorn plates should be used. Sorghum grain does not dry out in the field as well as corn, so you will need to make arrangements to have the crop artificially dried to a safe moisture content after harvest.

4. Buckwheat can be planted as late as July 15-25 in southern Illinois. It is primarily adapted to a cool, moist climate. High temperatures and dry weather at blooming time, particularly when both days and nights are hot, cause blasted blossoms that produce no grain. Another disadvantage of buckwheat is that it is very sensitive to cold and will be completely killed when the temperature goes below freezing. It can be used as feed for all livestock if used in a suitable mixture. It should be ground except for poultry.

Prepare the seedbed for buckwheat about the same as for corn. Plant with a drill at the rate of 3 to 5 pecks an acre and from 1 to 2 inches deep.

Buckwheat starts to bloom 5 to 6 weeks after planting and begins to ripen 3 or 4 weeks after flowering. Ripening continues until frost. The crop ordinarily matures 10 to 12 weeks after planting.

(Continued)

5. Proso millet is another emergency grain crop. It can be planted until late in July in southern Illinois. Proso is often called hog millet or broomcorn millet because its loose, open, drooping heads resemble broomcorn. It usually grows $1\frac{1}{2}$ to 3 feet high. It is best used as feed for hogs and poultry and should be ground.

Sow Proso at the rate of 2 to 3 pecks an acre with a grain drill. It is ready to harvest while the plant is still green and the seeds in the upper half of the head are ripe. If it is cut earlier, there is too much immature grain; if cut later, there is considerable loss due to shattering. To harvest, use a windrower and then combine.

6. In some cases these emergency grain crops will be of benefit, while in others it may be best to fallow the land this summer and plant winter wheat or legumes in the fall.

Remember that all these alternatives are strictly emergency measures. In all cases, yields will probably be lower than would be expected from corn or soybeans planted on time. If early frosts hit the area, soft grain will result; but with a normal fall, chances of a crop are good.

For more information on grain sorghums and emergency crops, contact your farm adviser and request these publications:

Circular 774 - "Grain Sorghums in Illinois"

Circular 726 - "Crops for Emergency Plantings"

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UNIVERSITY OF ILLINOIS

URBANA

June 25, 1957

WHAT'S THE STORY IN YOUR CORNFIELD?

No. 54

Cornfields talk! Leaves, stalks, roots, and ears tell the story. The effects of lack of nutrients, acid soil, and poor drainage as well as disease and insects all show up in cornfields long before they take their toll in decreased yields at harvest time.

Farmers should take a close look at their cornfields several times a season. Signs of nutrient deficiencies often indicate that the available supply of one or more fertilizer elements in the soil has fallen below the level necessary for economic returns.

Be thorough when checking cornfields. The first step is to compare the general appearance of the field with a "normal," healthy field. Then inspect several individual plants from various parts of the field, being sure to check the leaves, stalks and roots carefully. Later in the season it will be wise to check the ears as they develop.

Look at the leaves

1. Dark green, shiny leaves indicate healthy, normal plants.
2. Reddish-purple leaves, on young plants, are a sign of phosphorus deficiency.
3. Yellowing that begins at the tip and extends along the center of lower leaves is a sign of nitrogen shortage. Usually this symptom does not appear until the corn is past the side-dressing stage. But if young plants have a yellowish-green color, nitrogen side-dressing may pay.
4. Firing or drying along the tips and edges of the lower leaves indicates potash deficiency.
5. Grayish-green leaves with the edges rolled up toward the center are the result of drought. Extreme heat may cause the appearance of white tops in the field.
6. Small yellow, elliptical spots running lengthwise on the leaf are signs of helminthosporium blight disease. The spots gradually enlarge and turn brown.
7. Chemicals may cause burning at the tips, edges, and other points of contact on leaves. The tissue dies, and the leaf becomes a whitecap.

Look at the stalks for these symptoms

1. Normal-sized stalks and normal cross-sectional color indicate healthy plants.
2. Weak, spindly stalks, with either small twisted ears or no ears at all, are signs that phosphorus is lacking.
3. Dark-brown discoloration of the nodes of the stalk indicates a shortage of potash. Slice the stalk lengthwise to check for this symptom.
4. Slicing the stalk lengthwise may also show corn borer damage and stalk rot, which hollows the interior and causes early drying and stalk breakage.

(Continued)

Also look at the roots

1. Deep, spreading roots that crowd a half-bushel basket indicate healthy, normal plants. A well-developed root system is necessary for the uptake of nutrients and for anchoring the corn firmly in the soil.
2. Shallow roots with little spreading are the result of a lack of phosphorus during the early part of the season.
3. Flat, shallow root systems are caused by poor drainage and claypans.
4. Discolored and decayed lower parts of the root, and brace roots arising from the third or fourth node, indicate acid soil.
5. Pruned roots are caused by cultivating too deep and too close to the row. Corn rootworms may also cause severe pruning.
6. Roots that writhe and twist, and joined brace roots, are signs of chemical damage.

A future issue of Agronomy News will be devoted to factors affecting corn ear development and "danger signals" you should be looking for as they mature.

Even though it may be too late to remedy the causes of "danger signals" this year, inspecting cornfields will give information for planning a better corn crop next year. Proper fertilization and liming, based on soil test results, can correct nutrient deficiencies and soil acidity. These and other good management practices may enable your next year's cornfields to tell the story of healthy, high-yielding corn.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

July 1, 1957

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No. 55

In answer to many requests, this issue of Agronomy News is an index to all previous issues. Back issues of Agronomy News are not available; however, you may find this index useful in keeping your personal set of Agronomy News as a handy and helpful reference. For your convenience the index is subdivided into nine major headings.

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July 8, 1957

CORN EARS TELL A STORY

No. 56

Pay attention to what your corn ears can tell you. Doing so will enable you to plan for better and higher yielding corn crops next year. You can see the effects of lack of nutrients, plant population, and weather by inspecting your cornfields several times this season as the ears develop and mature.

A recent issue of Agronomy News (No. 54, dated June 25, 1957) told how to check leaves, stalks, and roots for "danger signals" of nutrient deficiencies, acid soil, poor drainage, and insect and disease damage. By looking at the ears as well, you can get a good picture of the story in your cornfields.

Compare your corn ears with these descriptions

1. Normal ears have well-filled tips and weigh about $2/3$ pound. Such ears produce the highest per acre yields.
2. Large ears weighing more than $2/3$ pound indicate that the plant population is too small. The most profitable population is 12,000 to 16,000 plants per acre. The higher rate is for highly productive soils (above 90-bushel yields), and the lower rate for the less productive soils. Populations below 12,000 do not take full advantage of available nutrients, water, and light.
3. Small ears often indicate that the plant population is too large for the fertility level of the soil. High populations (15,000 to 16,000 or above), grown on low to moderately fertile soils, invite lodging. Also, the small ears often make picking difficult, with the result that a high percentage of the corn is left in the field.
4. Ears having poorly filled tips and loose, chaffy kernels indicate a potash shortage.
5. Small, twisted ears with undeveloped kernels indicate lack of phosphorus. Phosphorus deficiency interferes with pollination and kernel development. Stalks with no ears at all also result from a shortage of phosphorus.
6. Small ears with unfilled tips are caused by a deficiency of nitrogen at a critical time. Corn needs nitrogen throughout the growing season, and especially large amounts during the time of most rapid growth in July and August. Nitrogen shortage at this time also means that the protein content of the kernels will be low.

(Continued)

7. Green silks at maturity may be due to too much nitrogen in relation to other fertilizer elements. For highest yields, the supply of nitrogen, phosphorus, and potash must be adequate. The soil must also have the amount of lime it needs.
8. Poorly filled ears may be caused by dry weather, which slows silking and thus interferes with pollination of the kernels.

Check the ears at harvest time as they come from the picker. Watch especially for barren stalks and small, twisted, poorly filled ears.

Finding "danger signals" in the ears, leaves, stalks, or roots of your corn will probably mean that you will get lower yields this year. But these signals can serve as a warning to improve your chance of getting a good corn crop next year.

Soil tests are a good way to check for soil acidity and nutrient deficiencies. Adequate lime and fertilizer, based on soil test findings, will do much to improve your next year's crop. But other good management practices and the weather also play an important role. A 100-bushel corn crop uses several hundred thousand gallons of water. High yields also depend on practices that improve soil structure, tilth, aeration, and drainage and maintain organic matter. These include good rotations, use of animal or green manures, and return of crop residues to the soil.

Adequate lime and fertilizer along with disease and insect control and good soil management will do much to improve future Illinois corn crops.

New Soils Extension Specialist

The Agronomy Department hopes you will join us in welcoming Dr. Samuel R. Aldrich, who joined our staff on July 1. Many of you may remember him, as he spent several months in Illinois a year ago, while on sabbatical leave from Cornell University in New York. Sam is here to stay this time and will be soils extension specialist for the College of Agriculture. When he is not out working with Illinois farmers, you'll be able to find him in 211 Davenport Hall.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

July 15, 1957

No. 57

IMPROVED PASTURES

Good pasture is possible on every farm. It is the result of establishing good stands of pasture forages and good management. There are three fairly simple steps in establishing good pasture stands:

1. Test and treat the soil.
2. Tear up the old soil.
3. Seed desirable legumes and grasses.

Test and Treat the Soil

Many pastures are poor because the soil on which they are growing is low in one or more of the essential nutrients. So the first step is to test your soil for acidity, phosphorus, and potassium. Consult your farm adviser for information on how to take the soil samples and where to have them tested. If the soil tests show that your soil needs lime, it should be applied at least six months ahead of the time you seed legumes. Phosphate and potash fertilizers can be applied when the seed bed is being prepared.

Tear Up the Old Sod Thoroughly

Soil treatments applied as the result of the soil test will not be fully effective until they are mixed with the surface soil. Spreading them on top of the old pasture is not enough. Tearing up the pasture is necessary to:

1. Destroy or weaken the old sod and keep it from competing too quickly with the new seeding.
2. Mix the soil treatment with the topsoil.
3. Help prepare the seed bed for the new legumes and grasses.

The job must be done thoroughly. Too often the sod is not torn up enough to form a fine, firm seed bed. On level to moderately sloping land, plowing makes the best seed bed. On steep hillsides where plowing is not practical, use a disk or field cultivator or similar tool. Work across the slope on the contour to help prevent erosion. If you use a disk or similar tool, spread the limestone and fertilizer on the surface and let the cultivation work them into the soil. However, if you plow under the old sod, spread the materials on top of the plowed ground and work them in with a disk or harrow as you prepare the seed bed.

Seed Desirable Legumes and Grasses

A mixture of legumes and grasses is usually better than either alone. Legumes supply nitrogen and high-quality forage; the deep-rooted ones are drought resistant. Grasses help to control erosion and protect the legumes against

(Continued)

heaving and other winter injury. A half-grass and half-legume mixture also reduces danger of bloat and often gives higher yields than pure legume stands. The kind and amount of legume and grass seed to use varies between different areas of the state, types of soil drainage, and fertility level of the soil. Consult your farm adviser or Circular 703, "Five Steps in Pasture Improvement," for specific forage mixtures and rates of seeding in your area.

When to Seed

Much improvement work on permanent pastures is done in the late summer. Grasses usually do best when sown at this time of the year, and legumes when sown in the spring. However, many farmers prefer to make the entire seeding in the spring if the lime that is needed has been applied the previous fall on a partly prepared seed bed. In the southern half of the state, both legumes and grasses can be sown in late summer.

Tear up the old sod in the spring or early summer and apply lime. Preparing the seed bed to control weeds during the summer will mix the lime with the soil. If the mixture contains birdsfoot trefoil, it should be seeded by the first week in August. Late summer seedings of legumes are not recommended for northern Illinois. A late summer seeding must be made early enough to make a good ground cover before winter. One advantage of late summer seedings over spring seedings is that they do not have to compete with the many annual warm-weather weeds, such as crabgrass, foxtail, lambs-quarters, pigweed, and vines. On rolling pastures a light seeding of small grain will help to hold the soil. In southern Illinois, winter oats or winter barley can be used. If the small grain makes enough growth to endanger the young forage seedlings, it should be clipped or grazed off.

How to Seed

Broadcast seedings made in August should be sown on a firm, rolled surface and then pressed into the surface with a corrugated roller. Legume and grass seeds need only 1/4 to 1/2 inch of soil over them; burying them deeper will decrease the chance of a good stand. A cultipacker seeder is an excellent tool for making pasture seedings. Band placement of legume seed and phosphate fertilizer is another good practice, particularly for late summer seedings. To do this, tubes are attached to the openings of the forage seed box on a grain drill and the tubes brought back behind the disks of the drill so that the forage seeds fall in a row behind each disk. Rolling immediately after seeding greatly improves the firmness of the seed bed and insures a better stand. After good stands of forage seedlings have been established, good pasture management will increase the productivity and longevity of pastures. See Agronomy News No. 48, dated May 16, 1957, for information on pasture management.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

August 5, 1957

No. 58

PUT MONEY ON LIMESTONE AND WIN

Limestone returns five dollars or more for each dollar invested. Years of continued research shows that in spite of high farming costs liming is still one of the most profitable single practices on Illinois farms.

Why is limestone such a good investment

Limestone corrects soil acidity and supplies calcium and magnesium and plant foods. Without lime, sweet soil becomes acid, and acid soil becomes more acid. Crops grow poorly on acid soils because fertilizer elements are less available. As soil becomes strongly acid, the phosphorus in the soil is changed into forms not readily available to crops. The nitrogen supplying power of soil is reduced as acidity discourages the growth and activity of desirable soil bacteria. These include nitrogen-fixing bacteria on legumes that take nitrogen from the air and convert it to useful forms, those bacteria that release nitrogen and other nutrients from organic matter by bringing about decay and those that change mineral forms into available forms by chemical change.

Limestone must be applied before legumes will grow successfully on acid soils. Legumes and legume-grass mixtures are the key to building and maintaining productive soils. They are the foundation of sound soil management and erosion control practices, as well as efficient livestock feeding and production. The best level soils should be in legumes every four or five years or more often if erosion, or physical conditions make problems.

How much lime is needed

Soil tests are the best way to find out how much lime each of your fields needs. Your farm adviser can give you details on taking samples and having the soil tests made.

Some fields may be slightly acid and need only two tons of limestone an acre; others may be moderately acid and need three tons; still others may be strongly acid and need four tons or more. It is important to apply the correct amount of lime. If three or four tons are needed to correct acidity, two tons won't prevent legume failures. On the other hand, it is not good business to apply four tons where two tons will do the job. After the initial lime application, soil tests should be made every seven or eight years and additional lime applied, if needed, for maintenance.

For fast correction of acidity use a good grade of limestone, all of which will pass through an 8-mesh (8 openings per inch). There is little advantage in material ground finer than 8-mesh; advantages of more finely ground limestone are not great enough to justify a higher price.

(Continued)

When is the best time to apply limestone

Apply limestone at least six months or, better yet, a year before seeding legumes. This is especially important when liming a field for the first time because it takes time for limestone to react in the soil and correct acidity. Disking and harrowing will distribute the limestone particles throughout the top two or three inches of soil where they will be within easy reach of young legume roots. If liming for the first time, don't plow the lime under directly ahead of the legume seeding. This would put the limed layer down out of reach of young legume seedlings. When reliming a field before it has become very acid, it does not matter if the limestone is plowed under. Also the lime can be applied at any time during the rotation that is convenient to you.

Where should limestone be applied

On land plowed for winter grain where legumes are to follow-- This allows the lime to be worked thoroughly into the surface soil about six months before the legume is seeded. Don't wait to apply lime until after the grain is sown because then it cannot be worked into the soil. On land plowed for corn or soybeans where small grains and legumes are to follow-- Seedbed preparation and cultivation will mix the limestone thoroughly with the soil. Also the lime will have about a year to correct soil acidity before the legumes are seeded. If spreading equipment is not injurious to the crop, limestone can be spread after planting corn or beans. On soybean stubble where small grains and legumes are to follow-- If there is no danger of loss by erosion, apply limestone as soon as possible after combining the soybeans and disk in to mix it with the soil. On cornstalk ground where small grains or legumes are to follow without plowing-- However, in northern and central Illinois cornstalks should be plowed under for cornborer control. If the corn is harvested in time for fall-plowing, lime can be applied any time after plowing. However, the field may be rather rough for the lime truck. Limestone can be applied before plowing but then it should have a good disking before plowing down. On permanent pastures where legumes are to be a part of a pasture-improvement program lime application is usually a must. If possible, plow up the old pasture to prepare a good seedbed. Put the limestone on after plowing and work it in. The lime should be applied at least six months before the legume seeding for best results. When reliming lime can be applied any time in the rotation that is convenient.

For more information on this subject request Circular 721, "Limestone - How To Use It, When To Use It, Where To Use It."

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Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

August 12, 1957

1957 Illinois Winter Wheat Yields

No. 59

These data are results from winter wheat variety trials conducted by the University of Illinois Agronomy Department at various experiment fields.

Table 1.--1957 DeKalb and Urbana winter wheat variety yields with 3 year (1955-57) average yields

Variety	DeKalb			Urbana		
	Yield	Test weight	3 yr. av. yield	Yield	Test weight	3 yr. av. yield
Soft Red Winter Wheat Varieties						
	bu/A	lb/bu.	bu/A	bu/A	lb/bu.	bu/A
Knox	39.7	58.1	37.0	23.0	56.2	36.0
Vermillion	33.7	54.9	37.6	20.2	54.1	40.4
Dual	37.6	56.7	37.0	22.4	54.4	38.7
Lucas	34.1	57.2	--	17.9	56.7	--
Seneca	34.7	56.0	--	14.9	55.0	27.0
Saline	31.8	56.7	37.3	21.1	56.4	37.8
Racine	--	--	--	26.7	56.5	--
Todd	--	--	--	11.3	50.2	--
Average	35.3	56.6	37.2	19.7	54.9	36.0
Hard Red Winter Wheat Varieties						
Triumph	39.6	59.5	37.4	20.9	56.6	34.5
Bison	29.7	56.7	--	13.2	53.1	--
Concho	33.6	58.3	--	12.6	49.9	34.8
Pawnee	33.9	57.9	37.2	19.6	56.7	37.1
Ponca	34.0	58.7	37.1	26.6	58.9	38.7
Westar	28.8	55.7	35.4	13.9	53.6	34.0
Average	33.3	57.8	36.8	17.8	54.8	35.8

Table 2.--1957 Brownstown, West Salem, and Bluffs Winter Wheat Variety Yields

Variety	Brownstown		West Salem		Bluffs	
	Yield	Test wt.	Yield	Test wt.	Yield	Test wt.
Soft Red Winter Wheat Varieties						
	bu/A	lb/bu.	bu/A	lb/bu.	bu/A	lb/bu.
Knox	30.9	58.0	39.9	60.2	34.1	57.5
Vermillion	27.7	57.0	34.7	59.0	35.2	57.0
Dual	33.4	51.5	39.7	57.2	39.5	55.0
Lucas	29.6	57.0	33.5	56.2	39.7	59.5
Seneca	36.5	55.0	34.2	57.5	32.0	55.0
Saline	32.8	55.0	30.3	56.0	37.5	56.0
Average	31.8	55.6	35.4	57.7	36.3	56.7
Hard Red Winter Wheat Varieties						
Triumph	--	--	38.2	59.7	34.2	58.0
Bison	--	--	--	--	29.8	56.0
Concho	20.2	53.5	31.3	56.5	30.0	55.0
Pawnee	22.0	55.0	30.9	58.0	33.3	57.0
Ponca	27.7	55.0	32.0	59.2	31.3	59.0
Westar	16.4	53.0	23.3	55.5	23.5	55.5
Average	21.6	54.1	31.1	57.8	30.7	56.7

The 1957 wheat crop was generally disappointing in yield and quality. The main reason for the low yield and quality of this year's crop was favorable spring and early summer environmental conditions for the build up of detrimental diseases. Septoria came in early and in many cases because of favorable weather conditions not only killed all of the leaves but also attacked the heads. Scab which attacks the heads was the most severe and widespread that has been observed for many years. Leaf rust came in early and, where Septoria has not killed the leaves, was severe on susceptible varieties. Mildew was severe locally but not generally widespread. All of these diseases, because they kill the leaves, result in the plants producing shriveled light test weight seed. The diseases also weaken the stems and cause lodging. With the exception of leaf rust there is no good resistance in any of the recommended varieties now being grown.

Several important factors were well demonstrated by the 1957 wheat crop in Illinois. They were: (1) The soft wheats, in general, produced a higher yield of better quality grain than the hard wheats particularly in southern Illinois, (2) Disease resistance, when available, is good crop insurance. This was expressed by higher yields of higher quality grain in the leaf rust resistant varieties Knox, Vermillion, Dual, and Ponca. Over the years, leaf rust has been a factor more often than has Septoria or Scab, and (3) Hessian fly damage is still a threat to the winter wheat crop.

What to do for the 1958 Crop

1. Plant good, well cleaned seed, certified if available, of a recommended variety. If buying seed, the quality is better in central and northern Illinois.
2. Check the germination of your seed wheat. Low test weight and diseased seed is often low in germination.
3. Treat your seed before planting. Use Ceresan M, Panogen, or a similar seed treatment material. Treated seed will produce stronger seedlings. This treatment will not control loose smut.
4. Observe the Hessian fly free date for planting. Dual, a Hessian fly resistant variety, may be planted somewhat earlier than the fly free date than other varieties.

Request Mimeo AG1766abc, for more data on winter wheat variety trials for 1957.

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AUG 20 1957

No. 60

August 19, 1957

1957 SPRING OAT VARIETY YIELDS

DEPARTMENT OF AGRONOMY

The 1957 spring oat crop was quite unsatisfactory, particularly in Central and Southern Illinois. However, in Northern Illinois there were fair to excellent yields of good quality grain.

The following table gives the yields and test weights of spring oat entries in the 1957 spring oat variety performance trials conducted by the University of Illinois Department of Agronomy.

Variety	Urbana		DeKalb		Brownstown
	Seeded May 2, 1957		Seeded Early April		
	Av. Yield bu/A	Test Wt. lb/bu	Av. Yield bu/A	Test Wt. lb/bu	
Andrew	29.7	25.3	77.0	36.4	No yields - oats not harvested
Beedee	27.5	21.3	93.5	36.5	
Branch	7.7	17.8	67.0	31.7	
Burnett	23.8	23.0	89.5	38.2	
Clarion	13.0	18.7	68.5	34.5	
Clintland	41.1	27.7	104.0	40.1	
Clinton	7.4	17.7	63.5	31.5	
Fayette	42.3	30.3	95.5	35.5	
Garry	10.2	19.2	76.5	29.7	
Logan	20.0	20.7	72.0	36.7	
Minhafer	43.5	30.8	115.0	37.4	
Mo. O-205	21.2	22.0	84.0	34.9	
Nemaha	27.0	25.7	94.5	37.3	
Newton	21.1	22.0	92.0	37.6	
Sauk	20.0	20.3	77.0	32.3	
Waubay	17.2	21.0	66.5	36.0	
	23.2	23.0	83.9	35.4	

Leaf rust infection on the spring oat varieties was extremely severe in 1957. Late seedings at Urbana (May 2) allowed for a very severe infection at that station for all of the susceptible varieties. Yield differences of the varieties at Urbana are directly correlated with the degree of leaf rust resistance inherent to the variety. Those varieties with leaf rust resistance are

(Continued)

Fayette, Clintland and Minhafer. The Newton variety has tolerance to leaf rust but not enough to withstand an infection as severe as it was in 1957, at Urbana. In normal years, Newton would have sufficient tolerance to escape severe injury to the disease.

Early maturing oat varieties did quite well at the northern (DeKalb) station. The early varieties Putnam and Nemaha, even though susceptible to rust, were early enough to escape the worst of the disease epidemic which appeared somewhat later at DeKalb than at Urbana. The mid-season and late maturing varieties were definitely affected by rust at DeKalb. Clinton, Clarion and Waubay, mid-season varieties, were badly infected with this leaf disease.

At Brownstown (South) late plantings of all spring oat varieties were not worth harvesting.

At every location, Clintland, a leaf rust resistant variety, was far superior to other recommended medium maturing varieties for yield and test weight except Minhafer, a new variety not yet recommended in Illinois. Minhafer is a promising new early to medium maturing oat with good rust resistance that merits consideration for future years. Although Clintland is susceptible to race 7 stem rust, in general, this disease will cause damage less often than leaf rust and the leaf rust resistance is perhaps more important.

In many areas, the leaf rust susceptible varieties, especially Clinton oats were lodged as the result of the rust infection. In the future, Clinton oat growers should certainly consider the merits of leaf resistant varieties such as Clintland (medium maturing) and Fayette (early).

Rust is not carried over in this area so it is almost impossible to predict an epidemic from year to year. The amount of rust that occurs in 1958 will depend upon the seasonal conditions, especially in the spring, and on the amount of inoculum that builds up in the southern states during the winter and early spring. Under normal conditions stem rust will not usually cause as much damage as leaf rust.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 9, 1957

GROWING WINTER WHEAT FOR 1958

No. 61

Much of the seed wheat that will be used to plant the 1958 Illinois winter wheat crop is of lower quality than usual. Therefore, to insure adequate stands and maximum winter survival of winter wheat, growers must pay more attention to approved seeding and fertility practices. Here are some suggestions from University of Illinois agronomists that may help get the 1958 wheat crop off to a good start this fall--weather permitting.

Choose winter wheat varieties recommended for your area. (Refer to Agronomy News No. 59 for variety yield comparisons, or write to the Agronomy Department and request mimeograph AG-1766-a,b,c, for the 1957 wheat variety performance data.)

Hard wheat - Pawnee, Ponca, and Westar for northern and central Illinois; Triumph for central Illinois only.

Soft wheat - Dual, Knox, Vermillion, and Saline for central and southern Illinois; Senaca for southern Illinois only.

Insist on cleaned and treated seed.

Wheat diseases severely damaged much of the 1957 wheat crop, causing many of the kernels to be small and shriveled. Shriveled wheat kernels may be lower in germination and may produce weak seedlings upon emergence. The result may be a poor stand and reduced winter survival. Thorough fanning and cleaning are absolutely necessary to remove these small, diseased and shriveled kernels from grain for seed purposes. Most certified seed wheat is already cleaned and treated, so your best bet would be to buy certified seed. Check the germination percentage, because much low-test-weight and diseased seed often germinates poorly.

To increase field germination and to protect new seedlings from blight, treat all seed wheat with a Ceresan- or Panogen-type seed treatment compound. Wheat scab spores are present on most wheat kernels this year. These spores produce a blight that can kill new seedlings after germination.

Label or tag all chemically treated seed grain that will be offered for sale. A new state seed regulation enacted in the 1957 Illinois state legislature requires that all chemically treated crop seeds offered for sale now be labeled or tagged to identify seed grain from feed grain. The attached label or tag should show the type of compound used, date treated, etc.

Provide adequate fertility.

Applying fertilizer for wheat at planting time may partly overcome low germination and poor seedling vigor of 1957 seed. Wheat especially needs readily

(Continued)

available phosphorus in the early stages of growth this fall. We suggest applying 20 pounds of P_2O_5 an acre on fields that test high in phosphorus and increasing the rate to 60 pounds per acre on fields that test very low in phosphorus.

On fields that test low in potassium, include 20 to 30 pounds of K_2O per acre in the fertilizer.

Wheat that will have a hay or pasture seeding made on it should have extra phosphorus and potassium in accordance with soil test requirements. Broadcast and work it in prior to planting.

A small amount of nitrogen in the fertilizer at planting time may help weak seedlings to make better fall growth on soils that are very low in organic matter.

Prepare a good seedbed and drill at a proper depth.

Poorly prepared seedbeds will cause uneven planting. Some seeds will be covered too deeply, while others will not be covered at all. Cover trash thoroughly. Do not plant small kernels so deeply as large ones. Under most conditions, if adequate moisture is available, wheat need be planted only one inch deep. If the soil is very dry, you may need to plant two inches deep; but remember that a poorer quality wheat that produces a weak seedling may have difficulty in emerging if planted two inches deep.

Plant at recommended rate.

Plant seed wheat at the rate of $1\frac{1}{2}$ bushels (6 pecks) an acre. Planting small seed at this rate will give more plants per acre, but the final stand should not be altered too much because undoubtedly many of the weaker plants will not survive the winter.

Observe the Hessian fly-free date.

The Hessian fly is still a problem in Illinois. Wheat yields can be drastically reduced if the crop is seeded too early. Dual, a soft wheat variety for southern Illinois that is resistant, can be planted earlier in the fall than other varieties and escape damage. However, research shows that Dual can be damaged by Hessian fly if planted too far ahead of the fly-free date. Consult your farm adviser for the fly-free date for your area so that you will know when it is safe to plant wheat to avoid fly damage.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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URBANA

October 21, 1957

HOW TO HANDLE SOFT CORN*

No. 62

Soft corn, or high-moisture corn, will present problems in handling due to late plantings in some parts of the state. Soft corn is corn that contains over 25 percent moisture when killed by frost. Even though soft corn has a high moisture content, this does not necessarily mean that it is immature. Corn is mature--that is, production of dry matter in the kernel is completed--at 33 to 35 percent moisture. For safe storage, ear corn should not be above 20 percent moisture. Above 20 percent added precautions must be taken for storage or an alternative method of handling must be used.

Percent of moisture in ear corn includes cob as well as kernels.

If the whole ear is to be stored, remember to consider the moisture in the cob. Do not get the moisture percentage of corn on the stalk by testing the kernels alone. Cob moisture will seep into the kernels during storage. For instance, if kernels from field corn test 20 percent, the ear moisture with cob included will be close to 23 percent. The kernels must be 18 percent or below to insure an ear moisture content of 20 percent or lower.

Handling soft corn is not too much of a problem for the livestock man.

The livestock man has several choices in handling soft corn. He can (1) hog it down, (2) store it wet in air-tight bins, or (3) make silage out of the whole plant or only the ears. Soft corn has the same feeding value per pound of dry matter as sound corn. Properly preserved soft corn can be fed safely to all livestock in cool weather.

The cash-grain farmer can handle soft corn in the following ways:

Dry it mechanically.

Heated forced air seems to be the best approach in saving soft corn, either shelled or ear, if the equipment is available. Normally, field shelling should not be started until the moisture of the corn is 28 percent or below. Above 28 percent moisture, shelling losses are higher, more kernels are damaged, the corn is not too clean, and maximum yield is reduced. For marketing purposes, the corn should be dried to 15.5 percent moisture and, for extended storing, to 13 percent. Drying below these figures is not economical.

Dry it on the stalk.

Field drying is simple and economical if the frost is followed by relatively dry weather. Corn on the stalk in central Illinois will usually lose 1 percent of moisture a day in September, $\frac{1}{2}$ percent a day in October, and $\frac{1}{4}$ percent a day in November. However, this method has drawbacks: (1) If wet weather follows the frost, the corn may not dry down to 20 percent until spring; (2) this year there may be loss due to stalk lodging because of a high incidence of gibberella and diplodia stalk rot; and (3) frosted immature corn frequently stalkbreaks.

* Prepared with assistance from the Departments of Agricultural Engineering, Agricultural Economics, and Animal Science.

Store it in the crib.

If the corn is reasonably mature when frosted, with moisture contents from 20 to 30 percent, it may be husked and cribbed. However, special precautions must be taken in storing the corn. It is important to provide air circulation to prevent spoilage caused by heat, mold, and insects. The following recommendations are offered as safeguards against loss or excessive damage:

1. Husk the corn clean. Any debris that partly fills the spaces between the stored ears slows air movement.
2. Distribute the corn evenly in the crib to keep a central trash pocket from forming below the spout--a place where spoilage will start.
3. Use crib ventilators to increase movement of air through the crib.
4. Make periodic checks of the stored corn, especially when the weather is warm.

Market it if permissible.

Corn that contains over 30 percent moisture cannot be cribbed safely. This corn should be dried on the stalk (if stalk rot is not serious), shelled when frozen, and sold to an elevator. To avoid a large discount because of moisture, it may be possible to sell the soft corn to a livestock feeder in the area. The current discount schedule is $1\frac{1}{2}$ cents off per bushel for $\frac{1}{2}$ percent of moisture between 15.5 and 20 percent, and then 2 cents off for each $\frac{1}{2}$ percent of moisture to 23 percent. There is no set discount above 23 percent; the deduction for moisture then becomes a bargaining proposition between seller and buyer.

All of the moisture discount is not used as a penalty. A bushel of soft corn has more water in it that must be removed to prevent spoilage. Discounts help the buyer to pay for removal of the moisture and for risks of spoilage during handling.

Further information on the soft corn problem is given in AEng. 546, Handling, Storing, and Feeding Soft Corn, available from the Department of Agricultural Engineering, University of Illinois College of Agriculture, Urbana, Illinois.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 4, 1957

No. 63

RESULTS OF 1957 ILLINOIS ALFALFA VARIETY PERFORMANCE TRIALS

In many areas of Illinois, there was too much moisture in the spring and early summer of 1957 for optimum growth of alfalfa, but the rest of the season was more ideal. There was considerable leafhopper damage to the first and second cuttings but little or no damage from the spotted alfalfa aphid. Lahontan, a new variety of alfalfa, is resistant to spotted alfalfa aphid but is susceptible to common leaf spot. Due to the high moisture conditions that were prevalent during the spring and summer, leaf diseases such as common leaf spot caused considerable damage, particularly to new seedlings, many of which were made in spring oats or wheat. Older stands were more seriously infected later in the summer.

Leafhoppers cause discoloring (yellowing and purpling) of leaves, shortened internodes, lack of bloom, and weak plants. Severe attacks may cause plants to wilt. Leafhoppers can be controlled by spraying with an insecticide such as methoxychlor, usually after the first cutting when regrowth is 4 to 8 inches tall. Treated alfalfa should not be grazed or harvested for at least 1 week after treatment. No resistant varieties of alfalfa are available at the present time.

Current alfalfa varietal recommendations in Illinois are as follows:

Northern Illinois - Pasture or hay (more than 2 hay years): Ranger, Vernal. Pasture or hay (2 hay years or less): Atlantic, Central Common (such as Kansas), Northern Common (such as Montana), Ranger, Vernal, DuPuits (certified).

Catch crop: Nonhardy (such as African, Arizona Common, California Common).

Central Illinois - Pasture or hay (more than 2 hay years): Buffalo, Ranger, Vernal. Pasture or hay (2 hay years or less): Atlantic, Buffalo, Central Common (such as Kansas or Oklahoma), DuPuits (certified), Ranger, Vernal.

Catch crop: Nonhardy (such as African, Arizona Common, California Common).

Southern Illinois - Pasture or hay (more than 2 hay years): Buffalo (preferred), Ranger. Pasture or hay (2 hay years or less): Atlantic, Buffalo, Central Common (such as Kansas or Oklahoma), DuPuits (certified), Ranger.

Catch crop: Nonhardy (such as African, Arizona Common, California Common).

Seed Supplies for 1958

Seed of Ranger is adequate. Supplies of Buffalo, Vernal, DuPuits (certified), and Atlantic are limited. Use of certified varieties is recommended in preference to uncertified varieties or blends.

(Continued)

Following are the results of the 1957 alfalfa variety performance trials which are conducted by the University of Illinois Agronomy Department at various locations in the state:

Variety	Urbana Experiment 104		DeKalb Experiment 132		Carbondale Experiment**
	Seeded May, 1953	4-Year Av.	Seeded April, 1955	2-Year Av.	Seeded April, 1955
	1957		1957		1957
	Tons/A	Tons/A	Tons/A	Tons/A	Tons/A
Buffalo	5.38	5.41	4.48	4.47	2.95
Vernal	5.32	5.54	3.83	4.13	3.12
Ranger	4.99	5.33	3.86	4.03	
DuPuits	5.39*	5.44*	3.42**	4.08**	
Atlantic	5.22	5.46	3.75	4.04	
Calif. Common	5.24	5.46	3.86	3.94	

* Stand reduced somewhat by bacterial wilt after 2 hay years.

** Stand reduced somewhat by bacterial wilt during 2nd hay year.

*** The other entries in Carbondale test are experimental varieties.

The following are brief descriptions of the leading varieties:

Ranger - Resistant to bacterial wilt. A good forage producer. As winter-hardy as most hardy common alfalfa.

Buffalo - Resistant to bacterial wilt. A good forage producer, and only slightly less winter-hardy than Ranger.

Atlantic - Slightly higher yielding than Ranger. Not resistant to bacterial wilt. About as winter-hardy as Buffalo.

DuPuits - High yields, a long growing season, and good seedling vigor. Recovers quickly after cutting, resistant to common leafspot, and winter-hardy. Recommended in Illinois only for two-year rotations because it is very susceptible to bacterial wilt.

Vernal - Resistant to bacterial wilt. Gives higher forage yield and is more winter-hardy than Ranger.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 11, 1957

PUBLICATIONS OF UNIVERSITY OF ILLINOIS
AGRONOMY DEPARTMENT

No. 64

The following list contains some of the most popular Agronomy Department publications of the past few years and also some more recent releases with which you may not be familiar. We present them as a guide to you in obtaining up-to-date information from your Agronomy Department. Order by number (B - bulletin; C - circular; AG - mimeograph; SR - soil report) and/or title.

Corn

- B605 1956 Illinois Corn Tests - Variety Performance. 30 p.
- B606 Experimental Corn Hybrids Tested in 1956. 32 p.
- AG1645 Recipe for 100-Bushel Corn
- AG1707 Effects of Planting Rate and Light Intensity on Corn Yields
- AG1709 Establishing Legumes in Corn
- AG1718 Breeding Corn Adapted for High Planting Rates

Small Grains and Oil Crops

- B556 Soil-Borne Wheat Mosaic. 35 p.
- C726 Crops for Emergency Plantings. 8 p.
- C774 Grain Sorghums in Illinois. 16 p.
- C782 Winter Barley: A Feed Insurance Crop for Southern Illinois. 6 p.
- AG1639 Oat and Wheat Seed Treatments
- AG1692 The Place of Grain Sorghums in Illinois
- AG1771 1957 Spring Oat Variety Data

Legumes and Grasses

- B569 The Clark Soybean for Illinois. 4 p.
- C559 Sweet Clover for Illinois. 24 p.
- C649 Better Farming With a Legume-Grass Program. 12 p.
- C650 Ladino Clover in Illinois. 12 p.
- C676 Soybean Diseases in Illinois. 32 p.
- C725 Growing Birdsfoot Trefoil in Illinois. 16 p.
- C727 Growing Red Clover in Illinois. 8 p.
- C740 Keeping Southern Illinois Pastures Productive. 12 p.
- C743 How to Make Good Grass-Legume Silage. 6 p.
- C756 Alfalfa. 19 p.
- C760 Five Years of Tests of Soybean Varieties for Illinois. 12 p. (With 1956 supplement)
- AG1713 Effects of Frequency and Dates of Cutting on Dry-Matter Yields of Sudan-Grass Varieties
- AG1716 Effect of 5 Legumes and Grass Species on Performance of Pasture Mixtures

Weed Control

- C718 Weeds of the North Central States. 239 p. (Charge)
- C771 Chemical Control of Weeds and Brush. 19 p.
- AG1708 Weed Control Studies

Soils

- B539 Soil Building With Legumes. 16 p. Describes results from Illinois soil experiment field.
- B550 How Valuable Are the Soils of Central Illinois? 36 p. Shows relative values based on farm earnings.
- B577 Yield and Composition of Corn Forage as Influenced by Soil Fertilization. 20 p.
- C575 How to Farm on the Contour. 6 p.
- C593 Grass or Gullies. 20 p. Tells how to build and maintain grass waterways.
- C604 Shall We Fall-Plow or Spring-Plow in Northeastern Illinois? 8 p.
- C663 Handling Northeastern Illinois Soils. 16 p.
- C667 Protecting Your Soil. 24 p. A brief guide to sound conservation practices.
- C721 Limestone--How to Use It, When to Use It, Where to Use It. 12 p.
- C724 Soil Treatment Recommendations Based on Soil Tests. 4 p.
- C734 Plain Talk About Soil Management. 16 p.
- C758 Understanding Soils. 40 p.
- C765 Potassium - When to Use It, Where to Use It, How to Use It. 12 p.

(Continued)

Soils (Cont.)

C777 The Morrow Plots. 18 p.
SR77 Henderson County Soils. 64 p.
SR78 Lawrence County Soils. 92 p.
AG948 The Morrow Plots
AG1481 Nitrogen for Illinois Corn
AG1562 What's in the Fertilizer Bag
AG1571 Nitrogen Fertilizers - What They Are and How They Act
AG1578 Effect of Cropping Systems on Corn Yields and on Physical Properties of Some Dark-Colored Soils
AG1588 Nitrogen Recommendations
AG1699 Sixteen Years of Soil Improvement at Brownstown Experiment Station
AG1705 Effect of Nitrogen Fertilizer and Legume Catch Crops Used With a Rotation
AG1710 Northern Illinois Experiment Field
AG1711 Nitrogen Composition of Grain and Stover From Nitrogen Soil Test Locations, 1955
AG1712 Winter Application of Nitrogen Fertilizer
AG1731 Available Water-Holding Capacity of Some Illinois Soils
AG1732 Five Suggested Plans for Simple Fertility Demonstrations
AG1733 What the Soil Tests Tell You
AG1751 Fertilizer, Fertilizer Materials and Rock Phosphates in Illinois. 7-1-56 to 12-31-56
AG1752 Rotations, Phosphates, Nitrogen, Agronomy Farm - Urbana
AG1754 McNabb Soil Experiment Field With a Summary of Results on 12 Dark Soil Fields
AG1755 Hartsburg Soil Experiment Field " " " " " "
AG1756 Carlinville Soil Experiment Field " " " " " "
AG1757 Minonk Soil Experiment Field " " " " " "
AG1758 Carthage Soil Experiment Field " " " " " "
AG1759 Aledo Soil Experiment Field " " " " " "
AG1760 Dixon Soil Experiment Field " " " " " "
AG1761 Northern Illinois Experiment Field--Description & 1957 Research
AG1765a Clayton Soil Experiment Field With a Summary of Results on 12 Dark Soil Fields
AG1765b Kewanee Soil Experiment Field " " " " " "
AG1765c Mt. Morris Soil Experiment Field " " " " " "
AG1765d Joliet Soil Experiment Field " " " " " "
AG1769 Guide to Northeastern Illinois Agronomic Research Center (Elwood)

General

Agronomy News. Timely releases of current agronomic research results
Agronomy Facts, Vol. 1, Vol. 2, Vol. 3, and Vol. 4 (Charge) Compilation of brief articles on pertinent agronomic topics
1958 Crop Varieties for Illinois (chart 35" x 21")
C766 Managing Soil Bank Acres. 15 p.
AG1737 Graduate Study in Agronomy. Brochure for prospective students

For topics not covered here or for more specific information, write to the University of Illinois College of Agriculture, Urbana, Illinois. Also watch the Agronomy News for the latest publications of your Agronomy Department and, if possible, tune in to WILL, the University of Illinois Station, for agronomy topics to be heard Monday of each week from 12:15 to 1:00 p.m. on the Illinois Farm Hour.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 18, 1957

No. 65

ILLINOIS SOIL TESTING SYSTEM

In the fall of 1943, the University's Agronomy Soil Testing Laboratory began testing soil samples for limestone (acidity), available phosphorus, and available potassium. Soil testing was started primarily because in 1943 potash was very scarce. Knowing just where a fertilizer was needed would make it possible to apply more conservative amounts. Since that time farmers have realized the economic importance of soil tests and have accepted them as a standard agricultural practice.

After the first year, the agronomy laboratory found that it could not handle all the soil samples that were sent in. Therefore, in 1944 the first county extension soil testing laboratory was set up in Whiteside County. By the end of 1945, 51 more county extension laboratories were in operation. At present we have in our state 82 county extension soil testing laboratories. The system of county laboratories used in Illinois has proved so successful that other states are following this pattern.

The county extension soil testing laboratory is supervised by the county farm adviser. The testing is done by trained technicians who receive their training from the University Soil Testing Laboratory. Applicants for training must spend two days at the University laboratory learning how to test soil for limestone, phosphorus, and potash. They are also required to send, while the county laboratory is testing soils, six samples a month to the University laboratory along with their results. In this way the University is able to check the accuracy of the testing being done by the county extension laboratories.

In addition to the 82 county extension soil testing laboratories, Illinois now has 40 commercial laboratories which also test soil samples. The commercial soil samples are checked and approved by the state ASC office.

Illinois' total of 122 soil testing laboratories exceeds that of any other state. A survey of the total samples tested in the 13 midwest states in 1954 showed that Illinois tested almost half of the total number tested. (It is also of interest to know that nine of these 13 midwest states are using the Bray test for phosphorus, and several states are using the Bray potash test. These

(Continued)

tests were developed by Dr. Bray, who is on the agronomy staff at the University of Illinois.) In 1956 all of our laboratories tested more than 650,000 soil samples. This number represents more than 2.3 million acres of Illinois farm land and includes about one of every three farms. The top four counties in number of acres tested were McLean, Stephenson, Macoupin, and Whiteside. Since the beginning of testing soil for limestone, phosphorus, and potassium in 1943, the soil testing laboratories throughout the state have sampled and tested a total of 17,837,800 acres.

Facts and suggestions

1. It will take about two weeks to get a report back after sending soil samples to a county or commercial laboratory. Before the potassium test can be made, the soil must be air dried for 10 days after it has been screened.
2. The county extension laboratories charge from 35 to 70 cents to have a sample tested for limestone, available phosphorus, and potassium. The county laboratory sets its own price per sample.
3. Soil samples should be taken when the soil is in good working condition. The soil technician cannot crush and screen mud balls.
4. Soil samples should be dried naturally in the air. They should never be dried on stoves or radiators or with any type of artificial heat.
5. Soil samples should be collected and tested six months or a year before applying fertilizer to the area.
6. The University soil laboratory tests only soil samples obtained from land that is used for growing major field crops. Soil from gardens and lawns should be sent to the University Floriculture Building.
7. Results of a soil test will depend on the way in which the sample is collected. Directions for collecting soil samples may be obtained from the county farm adviser or from the Agronomy Department, University of Illinois, Urbana, Illinois.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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URBANA

December 9, 1957

NEW HERBICIDES AND THEIR USES

No. 67

The following are a few chemical compounds that show promise in controlling certain types of weeds. Randox, Dowpon, and amino triazole are already available. Simazin, Randox-T, and EPTC are still in the experimental stage and are not yet recommended for use.

RANDOX is a pre-emergence chemical -- which means that it must be applied to the soil surface immediately after planting. It is recommended for controlling weeds in either corn or soybeans where annual grass weeds are the major problem. It is very effective against giant foxtail. Although its results will vary a little with weather conditions that follow application, it is the most consistent pre-emergence herbicide that we have yet had. It works best on the heavier soil types. Because its effect lasts for a comparatively short time, cultivation will be necessary to control late-germinating weeds. However, it may eliminate the first and sometimes the second cultivation. See Agronomy News No. 37 for more details on Randox.

DOWPON is specific for grasses and at present is our most effective chemical for eliminating serious perennial grasses like quackgrass and Johnsongrass. It is applied to the foliage of these grasses and is translocated into the root system. It decomposes slowly in the soil but residues will generally disappear in less than a month. Rates of 10 to 20 pounds an acre are sufficient to eliminate most perennial grasses. Dowpon, in general, cannot be used in corn and soybean fields after the corn and beans are planted without seriously hurting these crops, but some crops do tolerate it. At rates as low as 2 pounds per acre, it has removed seedling grass from alfalfa without harming the alfalfa. Dowpon at 3 to 5 pounds an acre is highly toxic to annual grasses, such as foxtail growing in fencerows. For spot treating serious perennial grasses, 1 pound of Dowpon in 5 gallons of water applied on the foliage to the point of runoff is sufficient to give good control.

AMINO TRIAZOLE is a nonselective material that is highly effective against Canada thistle. Four pounds of active amino triazole per acre has consistently eliminated Canada thistle in one treatment. Treatment should be applied when the thistles are approaching early bud stage; it is less effective on thistles that are blooming. In some cases amino triazole can be used before corn or beans are planted or in stubblefields after the grain stubble has been cut and the regrowth of thistles reaches five to six inches. The chemical leaves little or no residue, so crops can be planted as soon as two weeks after application. Amino triazole may have other uses but, because it is new, they have not yet been fully investigated. It is highly specific for poison ivy and is safer to use than 2,4-D when sensitive plants are growing near by.

(Continued)

SIMAZIN is an experimental chemical compound that is used as pre-emergence treatment only in cornfields. In experimental tests, it has controlled both broadleaf weeds and grasses all season long without injuring the corn. However, it is highly toxic to soybeans and small grains. A pre-emergence rate of two pounds an acre is sufficient to completely control weeds. Simazin seems to work well on light as well as on heavy soils. It produces good results if there is adequate distribution of rainfall throughout the season; however, it has not received adequate evaluation when used under dry conditions. This compound leaves a residue in the soil and there is some possibility that the residue may carry over into the second growing season. Additional field testing will be required before this chemical is recommended in Illinois.

RANDOX T is very similar to Radox except that a new compound has been added to give better control of broadleaf weeds. It will control both broadleaf weeds and grasses. This chemical, like Simazin, is designed for use as a pre-emergence treatment only in cornfields. It will injure soybeans. Radox T leaves much less residue than Simazin -- but like Radox it is irritating to handle. It works best on the heavier soil types. A broadcast rate of four pounds of acid an acre has completely controlled broadleaves and grasses from four to eight weeks.

EPTC is also a pre-emergence herbicide, but it seems to work best when incorporated into the seedbed either before or immediately after planting. It injures soybeans, but corn has some tolerance to it. EPTC controls both broadleaf weeds and grasses reasonably well.

CRABGRASS killers are potassium cyanate, phenylmercuric acetate, and sodium dimethyl arsonate. They all do a good job if applied when the crabgrass is in the seedling stage; repeated treatments are required. These materials are available and are sold under various trade names.

SOIL FUMIGANTS. A standard soil fumigant for several years has been methyl bromide. Two new materials that will be available in 1958 are Vapam and Mylone. They have not yet been fully tested to determine their effect on killing weed seeds, diseases, and insects; however, this information should be available soon.

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CROPS AND SOILS

NEWS

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URBANA

December 30, 1957 TWO YEARS' EXPERIENCE WITH MINIMUM TILLAGE

RECEIVED

JAN 8 1953

No. 68

A brief review of minimum tillage

Some people think that with minimum tillage the corn is planted in a rough, loose, coarse seedbed. On the contrary, even though the field looks rough, a good seedbed is prepared in the row itself.

There are many variations of minimum tillage methods; however, in Illinois, trials have involved mainly the following: (1) plow-planting (planter mounted on the plow or an ordinary planter used directly on plowed ground); (2) plowing, leveling, planting; or (3) plowing, wheel-track planting.

During seasons of excessive rainfall, such as 1957, minimum tillage shows promise of saving both time and gasoline. The Agricultural Engineering Department calculates that plow-planting takes 2.2 hours of labor and 25 horsepower hours per acre, whereas the conventional operation takes 3.8 hours of labor and 37 horsepower hours per acre. Minimum tillage also reduces soil compaction, especially on soils that are too wet from heavy rainfall; increases water infiltration and reduces runoff; and reduces early weed growth.

1956 and 1957 Illinois research results show great promise

In 1956, eight trials were conducted in different counties along with a trial at the Brownstown experiment center. The seven county trials that were harvested showed that good soil tilth and a good job of plowing are essential for most minimum tillage methods. If all corn yields from the conventional method and all yields from the plow-plant method are added and averaged, the average yield for plow-planting is 95 bushels compared with 98 for the conventional method. In four trials the plow-plant method outyielded the usual method. Results of the corn trial at Brownstown were as follows: conventional method, 91.2 bushels; plow-plant, 93.3; plow, drag steel wheel, and plant, 92.1; and tractor wheel and plant, 96.4.

In 1957, trials were conducted with corn and soybeans at Urbana, Brownstown, and DeKalb and with corn at county demonstrations. Corn yields at the research centers were as follows:

Method	Urbana		Brownstown		DeKalb	
	Corn	Soybeans	Corn	Soybeans	Corn	Soybeans
	Bu/A	Bu/A	* Bu/A	Bu/A	Bu/A	Bu/A
1. Usual seedbed (plow, disc twice, harrow, plant)	128.8	40.8		25.8	104.5	22.9
2. Plow, plant	128.2	45.7		27.2	103.3	24.0
3. Plow, spike-tooth harrow, plant	128.0	42.9		26.6	105.9	24.0
4. Plow, wheel-track, plant	125.6	43.0		28.5	98.5	23.2

*Brownstown corn was not harvested.

(Continued)

These results show that in general yields from minimum methods compare favorably with those from conventional methods. Obtaining the same yields with less cost means more money!

Plans for 1958

Next year complete research projects will be conducted at the three research centers (Brownstown, DeKalb, and Urbana) and less complicated trials will be made on eight or ten soil experiment fields in the state. In addition, 54 county farm advisers have requested minimum tillage demonstrations. The Agricultural Engineering Department will continue its work with minimum tillage and concentrate on new planting devices. The purpose is to obtain better seed germination by more uniform depth of planting, less air spaces around the seed, and smoother conditions in the row to increase the effectiveness of pre-emergence spray applications.

In general, minimum tillage shows tremendous possibilities on many Illinois soils. Farmers who have tried it have been pleased with the results and are planning operations on a wider scale for 1958.

In early spring the Agronomy News will give specific suggestions for preparing and carrying out a minimum tillage operation.

See Agronomy News No. 43 for other facts on minimum tillage.

Plan to attend Crop Performance Day on January 22, 1958, at the Law Building Auditorium. The program will begin at 10:00 a.m., and the following topics will be discussed: Performance of commercial corn hybrids and experimental corn hybrids in 1957; corn diseases in 1957; physiology of soybean oil production; soybean diseases and the cyst nematodes in 1957; weed control in corn and soybeans; 1957 performance of sorghums, spring barley, wheat, and spring oats; performance of different legumes and grass mixtures; performance of corn on minimum tillage; and chlorides and water-soluble phosphates in corn production.

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CROPS AND SOILS

NEWS

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URBANA

February 10, 1958

1957 SOYBEAN VARIETY YIELDS IN ILLINOIS

No. 69

Nine Locations, Yield in Bushels per Acre
(Varieties listed in order of maturity, early to late)

Region in Illinois:	North	East	West	South	Southern			Southernmost	
	Northern	Central	Central	Central	Central				
Location	Shabbona	Dwight	Urbana	Girard	Edge-wood	Eldorado	Carbon-dale	Ullin	Miller City
Chippewa	41.7	37.1	40.0	32.8					
Black Hawk	39.9	37.3	33.2						
Harosoy	47.3	41.7	44.2	36.5	40.7	38.5	16.8		
Hawkeye	42.4	40.4	40.1	32.8	30.6	34.3	17.4		
Adams	43.3	42.9	45.9	34.1	31.6	31.8	20.2		
Lincoln	44.3	43.4	44.1	36.2	34.3	35.5	17.7		
Clark		42.1	45.5	41.0	43.1	40.0	21.6	36.6	46.9
Chief					37.3	37.5	21.0	30.1	39.2
Wabash			43.1	34.3	40.8	36.2	17.0	28.6	41.2
Perry			47.7	42.8	37.1	39.7	22.1	34.7	41.8
Roe									
(1 bu/A rate)					39.5	36.4	20.7		
(20#/A rate)					29.0	36.4	21.1		
Dorman						31.0	22.4	33.2	38.2
Ogden								33.8	39.7
Lee								34.8	30.9

These are the latest recommended varieties for use in Illinois (arranged from earliest to latest):

Northern Illinois

Chippewa
Harosoy
Hawkeye
Adams

Central Illinois

Harosoy
Hawkeye
Adams
Lincoln
Clark

Southern Illinois

Adams
Lincoln
Clark

The above list differs from the recommended variety list published in Agronomy News No. 44, April 25, 1957, in that Blackhawk, Wabash, and Perry are no longer among the varieties recommended for use in Illinois.

Chippewa has replaced Blackhawk on the recommended variety list because of the results shown from eight-year tests at 15 locations in the North Central States. These tests showed that Chippewa, which is five days earlier than Blackhawk, produces slightly higher yields, is two inches shorter, and is less subject to lodging.

Clark should be planted in preference to Wabash or Perry because of the results of six-year tests at 15 locations in the North Central States. The results show that Clark produces higher yields than Wabash or Perry. Also, both Wabash and Perry mature later

than Clark and have a lower oil content. Wabash is three inches taller than Clark and is more subject to lodging. Perry has about the same height and degree of lodging as Clark; however, Perry has poorer seed quality than either Clark or Wabash.

What is the seed outlook for this year?

Germination tests of seed samples of recommended varieties conducted by the Illinois Crop Improvement Association show that germination of seed available this year will in general be good.

Your Agronomy Department advises using certified seed of a variety recommended for your region of the state at a rate of 50 to 70 pounds of seed an acre. Before planting, inoculate the seed with a suitable strain of nitrogen-fixing bacteria.

For additional information on varietal performance and characteristics, refer to Circular 760, "Five Years of Tests of Soybean Varieties for Illinois," which may be obtained from the Agricultural Information Office, University of Illinois, Urbana, Illinois.

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CROPS AND SOILS

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COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 17, 1958

THE ORIGIN OF ILLINOIS SOILS

No. 70

Approximately 300 different soil types have been mapped in Illinois. These different soils originated from the deposition of parent materials by ice, water, and wind, and since then have been gradually changed into their present state by weathering, topography, action of living organisms, and climate.

Parent material. Most of the soils in Illinois have been formed from material carried by great ice sheets or glaciers. There were four distinct glaciers that invaded the central United States - the Nebraskan, Kansan, Illinoian, and Wisconsin. However, it was the Illinoian and Wisconsin ice sheets that left the parent material for most of our soils.

The Illinoian glacier covered all of the state except the seven southernmost counties and most of Calhoun and Jo Daviess counties. Thousands of years later the Wisconsin glacier covered a little more than the northeastern quarter of Illinois. These glaciers, which may have been a mile or more thick, pushed down from Canada like giant bulldozers carrying large amounts of rocky material which they ground into a mixture of gravel, sand, silt, and clay and then redeposited as glacial till. If the glacier melted as fast as it moved down, the ice front was stationary and the material carried by the glacier piled up along the edge of the ice in a low ridge called a moraine. These moraines are common especially in northeastern Illinois.

Also during mild periods the glaciers released enormous quantities of runoff water from the melting ice, which carried glacial material out onto a floodplain below the moraine and deposited it in layers as outwash. In the floodplains of the major outwash streams, like the Illinois and Mississippi Rivers, finely ground "rock flour" was deposited. Later, during dry periods the winds picked up this fine, buff-colored material, called loess, and distributed it over the land. As would be expected, the thickest loess deposits were laid down close to the rivers.

Besides loess, which covers about 70 percent of the state, other common soil parent materials in Illinois are (1) glacial till, which varies from clay to coarse gravelly materials and covers about 13 percent of the northeastern part of the state; (2) glacial outwash, which varies from sand to silty clay and occupies about 11 percent of the state; (3) stream alluvium, recently deposited sediments in river bottoms, which occupy about 8 percent of the Illinois area; (4) limestone, sandstone, or shale residual materials, which are non-glacial in origin and of minor importance in the state; and (5) organic deposits, consisting of peat or muck.

Weathering causes soils to develop, mature, and age somewhat as humans do. Soils develop rapidly during youth and then slowly age as they continue to weather. Organic matter first accumulates and then is decomposed by microorganisms; in the process, plant nutrients are released. Clay minerals are formed, washed down into the soil, and tend to accumulate in the subsoil. Soil acidity also tends to increase.

Topography is a determining factor in soil development. It helps to determine the depth to the water table and the amount of rainwater that penetrates the soil and the amount that runs off and causes erosion. The water that runs off accumulates in depressions in low areas. These areas have gray-colored subsoils because of lack of oxygen. Well-drained areas have brownish subsoils.

Living organisms, such as the higher plants and microorganisms, also play an important part in soil development. In Illinois two types of native vegetation, deciduous hardwood forests and tall-grass prairie, have influenced the development of two great groups - the timber soils and the prairie soils. Undisturbed timber soils have a thin layer of dark topsoil which is composed of organic matter returned to the surface yearly in the form of tree leaves and other debris. The prairie soils have a deep layer of dark topsoil which is composed of organic matter resulting from the annual decay of deeply penetrating roots as well as tremendous amounts of top growth of the prairie grasses. In general, the prairie soils are more productive than the timber soils. Microorganisms decompose freshly deposited organic residues into humus and add nitrates and phosphorus to the soil.

Climate is an active weathering agent. Freezing and thawing, wind, and sunlight help to break down rocks and minerals. Water dissolves soil minerals and washes clay and organic matter into the subsoil. It is also important in the growth of living organisms in the soil. Climate helps to determine the kinds of soils that occur in different parts of the world.

A knowledge of how soils are formed is useful in planning a sound soil management program in specific areas, and a knowledge of how they are distributed is important in applying the findings of research. Soil maps have been prepared and soil survey reports written for many of the counties in Illinois. Study your soil reports and consult your farm adviser and local soil conservation personnel for help in understanding your soil.

For further information, see University of Illinois Circular 758, "Understanding Soils."

PLAN TO ATTEND FARM AND HOME FESTIVAL, MARCH 27, 28, and 29.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 24, 1958

1957 GRAIN SORGHUM YIELDS IN ILLINOIS

No. 71

Entry	Grain yields, bushels per acre					
	Champaign	Fayette	Pope	Jackson	Mason	Lawrence
<u>Hybrids</u>						
RS501	88	44	45	67	24	
RS590	109	*	40	70	#	
Tex. 601	101	*				
RS610	107	29	71	78	26	87
Tex. 611	93	*	30	67		92
Tex. 620	100	30	45	71	#	87
RS650	98	24	55	72	25	88
Tex. 660	92	*				
Kingcrost 3010	103	*	49	63	16	
Kingcrost 3013	102	34	55	62	19	
Kingcrost 3008	95	30	52	63	20	
Frontier 390	106	*	59	75	#	
Frontier 400	112	22	68	77	28	
Frontier 410	92	*	48	71	#	
DeKalb C44a	101	*	50	50	19	
DeKalb D50a	108	*	62	67	23	
DeKalb E56a	99	21		56	#	
DeKalb F62a	98	27	47	52	15	
<u>Varieties</u>						
Martin	83	*	40	61	#	68
Plainsman	70	*	36	52	#	77
Midland	66	*	33	40	#	
Reliance	54	24	33	46	#	
Combine Kafir 60	81	*	33	62	27	
Combine 7078	83	14	40	50	#	
Redbine 60	99	*	40	46	#	74
D. D. 38	66	*	46	35	#	58
Hegari	126	*	48	35	7	82
Early Hegari	109	13	73	63	19	
Caprock	87	*	25	56	#	
D. D. Yel. Sooner	76	*	71	57	#	
Redlan	881	*	35	64	#	
Westland	57	23	20	67	12	47
Combine Bonita	105	40				
Av. of 3 corn entries	115	49	32	56	11	
Av. of hybrids	100	29	48	66	22	88
Av. of varieties	83	23	41	52	16	68
Av. of all entries	94	31	45	59	19	76

*These entries were in the trial but did not reach sufficient maturity for harvesting.

#These entries were in the trial but had been damaged so severely by drought that yields were negligible.

In 1957 the University of Illinois Department of Agronomy tested 18 hybrid and 15 standard varieties of grain sorghums along with three corn entries at locations in seven counties in the state. The DeKalb trial was not harvested because of severe damage by birds. All grain yields listed in the table have been adjusted to 13 percent moisture. The hybrids consistently outyielded the standard varieties by as much as 15 to 30 percent.

The trial in Champaign County was planted in good soil, and moisture was adequate. The Fayette County trial was planted in Cisne silt loam on July 10 and harvested November 16--conditions were too wet to plant and harvest before that time. The field was flooded before harvest at the Pope County trial, making it difficult to harvest and thresh. The Jackson County trial received 1.63 inches of rain in July and 1.11 inches in August. The Mason County trial was planted in pure sand on June 1 and received no rain in July and August. It is of interest to note that in Mason County the average yield of sorghum hybrids was 22 bushels an acre, while the three corn entries averaged only 11 bushels an acre. The Lawrence County trial, planted on May 6, was the earliest one planted.

Some persons are interested in the silage yield of grain sorghums. At Dixon Springs (Pope County) both the hybrid and the standard varieties yielded approximately 12 tons of silage an acre compared with 16 tons an acre for the forage sorghum varieties at the same location.

The wet fall in 1957 emphasizes the need for artificial drying facilities if a farmer wants to grow an appreciable acreage of grain sorghums.

Use of sorghums will probably increase in Illinois on drouthy soils like sand and clay pan.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 3, 1958

HIGH-MOISTURE CORN AND SPOILAGE

No. 72

High-moisture corn is common this year because of late planting last spring and unfavorable drying conditions last fall. We can get a better understanding of this problem by seeing how water affects the developing corn kernel, how the kernel and cob are related and what causes the corn to spoil.

Water Relationships in the Developing Corn Kernel. The percent of water steadily decreases in the developing corn kernel from about one week after pollination to the time the kernel reaches physiological maturity, that is, when the dry weight of the kernels reaches a maximum that usually coincides with a moisture content of approximately 35 percent. Then, under favorable drying conditions, the moisture in the kernel continues to decrease to about 18 percent or lower.

The rate at which water enters corn kernels may be divided into four general periods: (1) The first period, which occurs largely during August, is when water enters the kernels faster than it is lost from them. The quantity of water in the kernels reaches a maximum about the end of August or the first of September. (2) The second period is the first week following maximum accumulation of water. During this time the kernels lose more water than they gain. (3) The third period is largely in September. During this period about equal amounts of water enter and leave the kernels. The kernel usually reaches physiological maturity at the end of this period. (4) The fourth period lasts from the time the kernel matures (about 35 percent moisture) until it reaches a moisture level that will permit safe storage.

The drop in moisture content in corn kernels from about 90 percent a week or so after pollination to about 35 percent when mature is due more to a rapid increase in dry-matter substances than to a decrease in water. During this period of translocation, nutrients and water are entering the developing kernels. The decrease in moisture below 35 percent is due entirely to loss of water. The kernels lose water primarily through the seed coat, but the rate of water loss is not satisfactory unless weather conditions are favorable for drying.

Corn that fails to dry at a satisfactory rate under good drying conditions in some locations may not have reached physiological maturity. Research indicates that if frost strikes before the crop is mature, translocation of nutrients and water into the kernels is only temporarily slowed down. When the weather warms up, translocation continues until the kernel is normally sealed off from translocating tissues. Consequently, even when conditions become favorable for drying, corn instead of losing moisture either maintains or picks up moisture from the plant and the cob.

Corn Grain and Cob Moisture Relationship. Even if corn kernels have reached maturity, they will absorb moisture from the cob while in the crib. In a test conducted for ten years in ten cribs, the results showed that cobs dry faster than kernels even though the cobs contained 29.9 percent moisture and the kernels 21.2 percent at cribbing time in November. By the end of December, the kernels had dried to 18.6 percent and the cobs to 23.8 percent. During March the cobs and kernels had reached a point where they contained the same amount of water--15 percent. From then on, the cobs were drier than the kernels. If corn is above this level on March 1, it should be dried to insure safe storage. Ear corn can be dried right in the crib by heated or unheated air. On a good drying day with the temperature 60

degrees or higher and the relative humidity about 55 percent, it is possible to remove one percent of moisture a day. With unheated air it will take about two days to remove one percent of moisture when temperatures average 40 degrees.

Research also shows that if clean, hand-husked corn contains about 18.5 percent moisture by March 1, there is little possibility that it will spoil in six-foot cribs. But if the kernels contain 20 percent or more moisture by March 1, some of the corn will spoil. Corn containing debris resulting from mechanical picking or stored in wider cribs would tend to go out of condition faster at these moisture percentages.

Causes of Spoilage of Corn in Storage. The moisture in stored corn is important because it adds to the humidity of the surrounding air, and it is a fine medium for growth of molds, bacteria, or other microorganisms. Mold grows abundantly when the relative humidity is above 74 or 75 percent, and some kinds of mold will grow well when the relative humidity is as low as 65 percent. At lower relative humidities, molds develop very slowly.

Heat is generated in stored corn by (1) the respiration of sound kernels, in which mostly carbohydrates are burned up and changed to CO_2 , water, and heat; (2) the respiration of the untold population of molds, bacteria, and other microorganisms; and (3) the respiration of the many varieties of insects that may infest the grain. As heat builds up, the sound kernel breaks down, free fatty acids and sourness increase, and water is formed. Heat increases respiration of the living organisms, and increased respiration produces more heat. The life processes in the corn bin develop more rapidly above a temperature of 55° to 60° F., to a point where life is killed off.

The first indication of spoilage is often visible mold growth. The next indication is noticeable heating. Molds can heat grain to a temperature of at least 130° F., and bacteria have been reported to heat stored grain to a temperature as high as 155° F. If heating continues, the grain will darken and the endosperm will appear granular.

Agronomy News No. 62 contains information on how to handle soft corn.

MARK MARCH 27, 28, and 29 ON YOUR CALENDAR. THE FARM AND HOME FESTIVAL WILL BE HELD ON THE UNIVERSITY OF ILLINOIS CAMPUS ON THOSE DAYS.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 10, 1958

No. 73

SEEDING SPRING OATS

When to Sow

Spring oats should be seeded as soon as the soil can be worked. Early sowing helps the seedlings to get a healthy start before plant diseases become serious and allows the crop to mature before extremely hot weather. Research shows that early sowing, with the cooler temperatures, gives the plants deeper roots.

On the average, there is a period of about two weeks when the relative seeding date will make little difference in time of maturity. One test showed that a delay of nine days in sowing date delayed maturity only two days, and a twenty-day delay in sowing delayed maturity five days. This same test also showed that plant height was hardly affected by these different sowing dates and that test weight and yield dropped off slowly at first and then more rapidly as sowing date advanced.

Results of an experiment conducted by the University of Illinois Department of Agronomy showed that in average seasons spring oats do well in northern Illinois when seeded any time from the last half of March to the middle of April. But in central and southern Illinois April seeding distinctly reduces yields. In central Illinois, oats should be seeded before the middle of March.

The importance of sowing oats early to minimize damage from disease, especially leaf rust, was clearly demonstrated in the 1957 growing season on the University of Illinois Agronomy Farm. The table below shows the advantage of early seedings over late seedings, as well as the importance of leaf-rust-resistant varieties.

Seeding date	Resistant varieties	Tolerant varieties	Susceptible varieties
	Clintland	Beedee	Clarion
	Fayette	Nemaha	Clinton
	Minhafer	Newton	Waubay
March 29	89.6	80.4	51.2
May 2	42.3	34.9	12.5

(Yields, in bushels per acre, are the average of all three varieties.)

Do not be afraid of sowing oats too early. Hard freezes have been known to kill some plants, but the remaining ones will yield more than later seeded oats.

(Continued)

What to Sow

It is best to use certified seed. If that is not possible, be sure that your seed oats are of good quality. Two factors that help to determine seed quality are kernel plumpness and test weight. A low test weight in seed oats generally means a lower germination percentage. Research showed that oats testing around 25 pounds germinated about 60 to 70 percent, whereas oats testing around 35 pounds germinated 95 to 100 percent. At three weeks the seedlings from the lighter oats weighed only 60 percent as much as the seedlings from the heavier oats. The seedlings from the light-weight oats did not catch up with the heavy oats until they were ten weeks old. If it is necessary to use low-test oats, increase the planting rate until you get the same amount of viable seeds per square foot as if you seeded the normal rate of high-test, viable seed.

Varieties are thoroughly discussed in Bulletin 788, "Spring Oats in Illinois," which was recently released. Also refer to Agronomy News No. 60.

How to Sow

1. Before sowing oats, treat the seed to insure a good stand of vigorous, healthy plants. The following are the latest recommended materials for treating small-grain seed: (1) For slurry machines - Panogen 42, Panogen 15, Ceresan 200, Ceresan M-2X, or Ceresan M. (2) For machines designed to use liquids, such as the Panogen treater and Mist-O-Matic - Panogen 15, Ceresan 75, or Ceresan 100. The true liquids, Panogen 42, Panogen 15, Ceresan 75, Ceresan 100, and Ceresan 200, do not settle out and thus have an advantage over Ceresan M. Remember to follow the directions on the label and to handle the fungicides carefully because they contain mercury.

2. Seed oats on land previously planted with soybeans as a first choice, and after corn as a second choice.

3. Seed with a drill if possible. In tests at the Illinois Agricultural Experiment Station, drilled oats outyielded broadcast oats by 5 to 10 bushels an acre. One way of incorporating minimum tillage in your oat seeding would be to have the drill attached behind the disk.

4. Seed drilled oats at the rate of 8 pecks an acre; seed broadcast oats at the rate of 10 to 12 pecks an acre.

Remember Farm and Home Festival on March 27-29
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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 17, 1958

No. 74

CONTROLLING JOHNSONGRASS

Johnsongrass is a perennial grass that spreads rapidly from seed and by underground stem-like roots or rhizomes. This grass was first introduced into the United States from Turkey in 1830. In 1840 it was named Johnsongrass after Colonel William Johnson, a man who thought the grass had a crop potential. Since that time it has spread over the entire southern United States and is fast becoming the major weed problem in southern Illinois. Seventy days from the time a seed of Johnsongrass germinates, the new plant is producing its own seed; thus it is possible to have several seed crops a year. It is a warm-weather plant and grows rapidly during June, July, and August. It first appears in a field as a few scattered clumps but becomes a solid stand in a few years if not controlled.

Controlling clumps of Johnsongrass

Before the plants produce seed, apply a chemical called Dowpon at the rate of one pound in five gallons of water to the scattered clumps. Apply when the grass is between one and two feet tall; treat the second time about three weeks later to kill any new growth. Apply the spray until the leaves are wet but not dripping.

Soil sterilants, such as sodium chlorate and Atlacide, are also efficient in eliminating clumps of Johnsongrass. They may be used either in the dry form or mixed with water. The recommended rate for sodium chlorate is four pounds per square rod and for Atlacide six pounds per square rod.

Controlling solid stands of Johnsongrass

Where possible, grow a winter grain (barley, oats, or wheat) on fields that are heavily infested with Johnsongrass. Johnsongrass competes heavily with corn and soybeans because it grows best during late June, July, and August. Normally a winter crop is harvested before the grass begins its vigorous summer growth. After the grain crop is harvested, the area can be plowed and then disked at two- to three-week intervals until fall. This tillage practice will prevent the weed from producing seed and will tend to exhaust the food supply stored in its root system. In the past two years, a chemical treatment of Dowpon has completely eliminated established stands of Johnsongrass in tests in the Alexander-Pulaski area. The grass was allowed to grow for 10 to 14 days after winter grain harvest. Then the area was chopped with a stalk cutter. When the grass had regrown to a height of 12 to 18 inches, it was treated with 8 pounds of Dowpon in 30 gallons of water per acre. Three to four weeks later the area was fall-plowed. At the present cost of Dowpon, it would appear that chemical treatment costs no more than tillage after harvest of small grains, and the chemical treatment may be more effective.

(Continued)

On solid stands, sodium chlorate and Atlacide are less desirable than Dowpon because (1) they are expensive and (2) they sterilize the soil for about one year. Also sodium chlorate, when dry, will burn if ignited; therefore it should be handled very carefully. Atlacide, a compound of sodium chlorate and calcium chloride, is less hazardous to handle.

Chemical treatment before planting

If it is not possible to grow a winter grain, Dowpon can be applied to Johnsongrass before corn is planted. With this treatment, omit spring tillage to permit the grass to emerge as early as possible. When the grass is 12 inches tall, apply Dowpon at the rate of 10 pounds in 30 gallons of water per acre. Plow the treated area about one week after application, and plant corn two to three weeks after plowing so that the Dowpon will decompose enough not to injure the corn. On sandy soil, delay planting from three to four weeks after plowing.

Although this treatment delays corn planting about a month, the delay is not so serious in the southern part of the Johnsongrass area as in the northern region. In the northern region, begin preplanting treatments when the grass is eight inches tall in the spring and use shorter season varieties of corn or soybeans. Preplanting treatments with Dowpon have not completely eliminated established stands of Johnsongrass, but infestations have been reduced to the point where near-normal crop yields can be expected.

Research indicates that better results may be obtained from using two five-pound applications of Dowpon spaced about one week apart than from using one ten-pound application as a spring pre-planting treatment.

Fencerow and non-crop area treatment

When Johnsongrass is two to three feet tall, spray the foliage with Dowpon at the rate of 8 pounds in at least 30 gallons of water per acre. Thoroughly wet the foliage to the point of run-off. This treatment will control seed production; a second application about two weeks later at the same rate helps to kill the roots.

For further information, request AG-1778, "Controlling Johnsongrass in Illinois," from the Department of Agronomy, University of Illinois College of Agriculture, Urbana, Illinois.

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CROPS AND SOILS

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URBANA

March 24, 1958

No. 75

1957 FORAGE SORGHUM YIELDS IN ILLINOIS

Sorghum Yields (Tons per Acre) at Five County Locations in Illinois
and Average for All Locations

Entry	Champaign	Fayette	DeKalb	Pope	Jackson	Average of all locations
<u>Hybrids</u>						
RS301F	21.4	19.0	18.7	17.5	19.1	19.1
RS302F	19.3	18.5	20.9	18.9	17.5	19.0
RS303F	19.8	18.0	21.4	16.2	17.0	18.5
S-210	24.6	18.0	18.5	16.7	16.1	18.8
Kingcrost 3055	15.2	16.4	17.4	13.0	12.9	15.0
Kingcrost 3065	25.5	20.5	22.7	18.2	17.6	20.9
DeKalb Forage	25.3	17.5	15.5	13.3	14.0	17.1
<u>Varieties</u>						
Atlas	22.2	16.1	19.0	13.8	15.5	17.3
Tracy	25.4	17.4	18.5	16.4	17.8	19.1
Sart	31.0	22.0	23.5	19.2	19.7	23.1
Rox Orange	21.4	17.1	18.6	15.4	--	18.1
Sourless Orange	19.9	20.7	19.1	13.9	--	18.4
Sourless White	21.5	15.5	20.1	13.3	--	17.6
Honey Sorgo (Tex.)	23.0	17.3	25.6	14.2	17.0	19.4
Honey Sorgo (Okla.)	25.0	19.0	23.8	14.6	15.9	19.7
Hegari	15.6	13.9	11.5	9.4	13.4	12.8
Early Sumac	19.5	16.6	--	14.4	15.5	16.5
Sugar Drip	25.4	20.7	20.6	19.4	19.3	21.1
Sumac 1712	20.2	18.7	20.6	13.7	17.0	18.0
Wiley	24.9	24.9	20.6	12.6	18.2	20.2
Kansas Orange	26.0	17.8	20.2	15.7	17.9	19.5
African Millet	25.0	19.3	20.8	15.2	--	20.1
Norkan	16.8	14.6	14.4	12.2	12.5	14.1
Ellis	18.1	14.4	14.8	12.0	--	14.8
<u>Corn</u>						
Av. of 2 corn entries	17.0	14.6	18.7	11.3	16.2	15.6
Av. of all entries	21.8	17.8	19.4	14.7	16.5	18.2
Av. of hybrids	21.6	18.3	19.3	16.3	16.3	18.3
Av. of varieties	22.4	18.0	19.5	14.4	16.6	18.2

This is the second year in which forage sorghums, including some of the new hybrids, have been grown in trials conducted by the Illinois Agricultural Experiment Station, and again this has been a state-wide cooperative project. All of

(Continued)

the silage yields listed in the table on the other side have been adjusted to 70 percent moisture. Comparisons were made with seven of the forage sorghum hybrids, 17 standard varieties, and two corn varieties. The sorghums averaged from one to four tons more silage per acre than corn. Specific standard varieties or hybrids yielded as much as eight to ten tons more than corn.

Some of the tested varieties are not adapted to Illinois conditions. Sart, Sugar Drip, Wiley, and several of the others are molasses sorghums that were developed in the southern states and were included only for comparative purposes. Most of the sugar-type varieties are too late for grain, and even under a long growing season they do not produce an appreciable amount of grain.

The two-year averages for grain yields from forage sorghum taken at two locations in 1956 and at three locations in 1957 were as follows (in bushels per acre): Wiley, 4; Sart, 12; Tracy, 14; Atlas, 35; Sugar Drip, 39; Sourless Orange, 43; and Kansas Orange, 52. Two good-yielding hybrids for the two-year period were RS301F with 60 bushels and DeKalb Forage with 57 bushels. From these trials it is apparent that the hybrids yield considerably more grain than standard varieties.

It is known that matured grain of forage sorghums will pass through animals undigested even after going through the silage process; however, if the sorghum is harvested when the grain is in the stiff-dough stage, the grain is less likely to be wasted.

An effort is being made to find a variety or hybrid that will be resistant to lodging in Illinois. A forage sorghum that will not lodge so readily as Atlas is desired; however, from the lodging notes taken at the five locations, it is apparent that not many of the entries are as good as Atlas. At all five trials, RS302F and the two Kingcrost hybrids lodged badly; RS301F, RS303F, and S-210 stood up best, but were not completely free from lodging.

New and experimental hybrids need to be tested further for both agronomic and nutritive value. However, from tests so far it appears that certain forage sorghum hybrids will prove superior to others for use as silage in Illinois.

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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

March 31, 1958

No. 76

CONTROL OF CANADA THISTLE

Canada thistle, which is a primary noxious weed, is a serious weed pest in many Illinois crop fields. The plant is a perennial, propagating from seeds and underground root system. The roots often grow 10 feet deep and extend in all directions below the plow layer.

Cultural control method

One cultural method that has proved effective in controlling Canada thistle is to plow the weed under when budding starts and follow with a field cultivator every two or three weeks until fall or until winter wheat or rye is planted. After the crop is harvested the following year, the process should be repeated. Following this practice for two or three years should eliminate most of the thistles.

Two chemicals recommended for controlling Canada thistle

2,4-D can be used as a selective-type herbicide in crop fields to stop seed production. As a spot treatment, it can be used at the rate of one-half to one pound of acid in 10 to 15 gallons of water per acre. The ester formulation is preferred. Rates exceeding one pound per acre are usually less effective because heavy rates cause a rapid top-kill and less of the 2,4-D penetrates to the roots. A slow top-kill is most effective in destroying roots.

Treat two or three times a season. Make the first application when the plants range from 12 inches high to early bud stage and later applications whenever regrowth occurs. To successfully eradicate susceptible strains, repeat the treatments each year for two or more years. You may find that some strains of thistle in your field are resistant to 2,4-D.

If the thistles are located in a growing crop and a spot treatment is not practicable, use a lower rate of application, depending on the crop. Apply the material at a time when it will do the least harm to the crop. For instance, in small grain apply the chemical after the grain tillers but before it enters the boot stage. This treatment may somewhat reduce crop yield, but it will also reduce thistle seed production. After the grain has been harvested, clip the stubble and treat the regrowth when it is six inches tall with more 2,4-D or, better yet, with amino triazole.

Amino triazole (ATA) is a new non-selective herbicide that is now available to use in controlling Canada thistle. Even though it costs somewhat more per treatment, it is far superior to 2,4-D for killing thistles. Apply ATA to actively growing thistles in the spring when they are from eight to 12 inches high and before budding begins. If the thistles are mature, clip them and spray

(Continued)

the regrowth when it is six inches tall. Research results indicate that thistles can be almost completely eliminated by using ATA at the rate of eight pounds (four pounds of actual amino triazole) in 30 to 40 gallons of water per acre. Spray until the thistle foliage is thoroughly wet. If you use a hand gun, you may need more water per acre. If you use a three-gallon tank hand sprayer, place ten level tablespoons of ATA in one gallon of water or one pound in six gallons of water. ATA is toxic to crop plants; therefore, it should be used only at a spot treatment in crop fields.

Amino triazole has been tested as a pre-planting treatment for thistle-infested fields to be planted to corn. The rate was eight pounds (four pounds of actual ATA) in 20 gallons of water per acre. The spray was broadcast over the areas in the spring when the thistles were six to 10 inches tall. Two weeks later the areas were plowed or disked, the seedbed was prepared, and the corn was planted. This treatment substantially reduced the thistle stands without damaging the corn. If you use this treatment, do not disturb the thistles before applying the chemical, because early spring growth may be retarded and thus both the treatment and the planting date of corn may be delayed.

Amino triazole acts slowly; therefore, do not disturb the treated thistles for at least two weeks after treatment. Five to six days after treatment the plants will begin to turn yellow and then white. Top growth will usually die in two to three weeks. New growth may appear from the roots, but it is generally chlorotic also. However, if the new growth is normal, it should be re-sprayed.

Maximum use of 2,4-D will greatly reduce thistle infestations in many areas. However, 1957 results obtained from field tests conducted at 32 locations in cooperation with your Department of Agronomy showed that amino triazole consistently reduced stands of thistles by 90 percent or more. ATA gave complete kills in many cases, with little or no regrowth.

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AGRONOMY

CROPS AND SOILS

Department of Forestry

NEWS

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URBANA

No. 77

April 7, 1958

CONTROL GRASS IN CORN AND SOYBEANS

RECEIVED
APR 9 1958
DEPARTMENT OF FORESTRY

Grassy weeds reduce corn and soybean yields

A study made in 1957 by your Agronomy Department showed how various stands of giant foxtail can reduce yields of corn and soybeans. The corn and soybeans were planted in an area known to be heavily infested with giant foxtail. Corn was planted at the rate of 16,000 plants per acre, and soybeans were drilled in 40-inch rows at the rate of one bushel per acre. The row centers were kept clean by cultivating three times. The rows were infested with giant foxtail, which were thinned to different stands in the row. The heaviest foxtail stand, which was concentrated in a three-inch band in the row, contained about 70 plants per running foot of row. The treatments were replicated six times.

Yield Reductions Caused by Giant Foxtail in Corn and Soybeans

<u>Foxtail Stand</u>	<u>Corn Yield, bu/A*</u>	<u>Soybean Yield, bu/A**</u>
3-inch band over row	74.3	26.0
1 plant every inch	86.6	35.9
1 plant every 2 inches	89.5	39.5
1 plant every 4 inches	93.5	40.4
1 plant every 12 inches	95.0	41.6
1 plant every 24 inches	98.1	42.3
Check - no foxtail	100.0	43.1

*Converted to 15.5% moisture; **converted to 12% moisture.

This experiment will be conducted for three years so that some of the climatic variables can be further studied. However, the work so far indicates that if farms are heavily infested with giant foxtail or other annual grasses, applications of a herbicide will help tremendously in preventing yield losses.

Consider using pre-emergence herbicides

Randex (CDAA) will again be available for use in 1958. This new pre-emergence chemical can be used on both corn and soybeans. It is a grass-selective herbicide that will kill such grasses as wild millet or giant foxtail, green and yellow foxtail, barnyard grass, downy brome grass, and other annual grasses that infest crop land. This chemical does not consistently control broadleaf weeds.

Randex is recommended for wide use where grasses are the major problem, because corn and soybeans both have a tolerance to it, and it has been more stable than many other chemicals under varying weather conditions. However, moisture conditions following application and the way in which it is applied will influence its effectiveness for controlling grasses.

When to apply

For best results, apply at planting time, or within two or three days at the most; otherwise, rains may prevent effective applications. The material can be applied by mounting band sprayer equipment on the planter so that the spray falls over the row behind the planter press wheels.

Like other pre-emergence chemicals, Randox is most effective when the soil has enough moisture to cause the weed seeds to germinate. If the soil is

too dry for two or three weeks after treatment, effectiveness of the spray may be somewhat reduced. Effectiveness will also be reduced if the area is cultivated too soon after application. Radox will last three to five weeks. However, if control appears to be poor, the field should be cultivated as soon as practicable.

Do not use Radox on sandy soils or on light soils that are subject to severe leaching, as the chemical will leach downward from the zone of effective control. Radox is very irritating to the skin. Use rubber gloves when handling it, and stay out of the spray drift.

Rates

For heavily infested grass areas, particularly those adjacent to fence-rows and drainage areas, Radox may be broadcast on at the rate of 4 quarts in at least 20 gallons of water. For band application directly over the row, use 1 1/3 quarts of Radox to about 7 gallons of water. Spray in a 12- to 13-inch band. This width helps to insure more satisfactory control of weeds when spraying is followed by cultivation later in the season. With the band treatment, about three acres can be sprayed per gallon of Radox.

1956 and 1957 results

On 23 cornfields where Radox was applied in 1956, full-season control was generally 80 percent or better. In several of the fields where control was reduced, the poor results were due either to mechanical difficulties in making the treatment or to wind drift from the treated band.

Several of the weed control demonstration plots in 1957 failed to show satisfactory control with Radox because of excessive rainfall at time of application. However, discounting these failures, 72 percent of the locations with corn reported 80 percent control or better with Radox.

Corn yields were 5 to 25 percent higher on plots treated with Radox than on untreated but cultivated plots. Several of the soybean plots were washed out, but 80 percent of the locations reported 80 percent control or better. Effectiveness of control was reduced somewhat at all locations in 1957 because of rain following application. Where Radox was applied, soybean yields increased an average of 21 percent above yield on the cultivated check that received no treatment. In eight fields, yields were increased 6 bushels per acre where a band treatment of Radox was applied to control grass.

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CROPS AND SOILS

NEWS

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April 14, 1958

PUBLICATIONS OF UNIVERSITY OF ILLINOIS
AGRONOMY DEPARTMENT

No. 78

The following list contains some of the most popular Agronomy Department publications of the past few years and also some more recent releases with which you may not be familiar. We present them as a guide to you in obtaining up-to-date information from your Agronomy Department. Order by number (B - bulletin; C - circular; AG - mimeograph; SR - soil report) and/or title.

- Corn
B622 1957 Performance of Commercial Corn Hybrids in Illinois. 40 p.
B623 Performance of Experimental Corn Hybrids, 1957. 44 p.
AG1645 Recipe for 100-Bushel Corn
AG1707 Effects of Planting Rate and Light Intensity on Corn Yields
AG1709 Establishing Legumes in Corn
AG1718 Breeding Corn Adapted for High Planting Rates
AG1777 Nitrogen for Corn

Small Grains and Oil Crops

- B556 Soil-Borne Wheat Mosaic. 35 p.
C726 Crops for Emergency Plantings. 8 p.
C774 Grain Sorghums in Illinois. 16 p.
C782 Winter Barley: A Feed Insurance Crop for Southern Illinois. 6 p.
C784 Winter Oats for Southern Illinois. 16 p.
C788 Spring Oats for Illinois. 24 p.
AG1639 Oat and Wheat Seed Treatments
AG1692 The Place of Grain Sorghums in Illinois
AG1771 1957 Spring Oat Variety Data
AG1780 Summary of Illinois Soybean Variety Demonstration
AG1785 Grain Sorghum Variety Trial

Legumes and Grasses

- B569 The Clark Soybean for Illinois. 4 p.
C559 Sweet Clover for Illinois. 24 p.
C649 Better Farming With a Legume-Grass Program. 12 p.
C676 Soybean Diseases in Illinois. 32 p.
C725 Growing Birdsfoot Trefoil in Illinois. 16 p.
C727 Growing Red Clover in Illinois. 8 p.
C740 Keeping Southern Illinois Pastures Productive. 12 p.
C743 How to Make Good Grass-Legume Silage. 6 p.
C756 Alfalfa. 19 p.
C760 Five Years of Tests of Soybean Varieties for Illinois. 12 p. (With 1956 supplement)
AG1713 Effects of Frequency and Dates of Cutting on Dry-Matter Yields of Sudan-Grass Varieties
AG1716 Effect of 5 Legumes and Grass Species on Performance of Pasture Mixtures
AG1772 Alfalfa for 1958

Weed Control

- C718 Weeds of the North Central States. 239 p. (Charge)
C771 Chemical Control of Weeds and Brush. 19 p.
AG1775 Summary of Illinois Chemical Weed Control
AG1778 Controlling Johnson Grass in Illinois

Soils

- B539 Soil Building With Legumes. 16 p. Describes results from Illinois soil experiment field.
B550 How Valuable Are the Soils of Central Illinois? 36 p. Shows relative values based on farm earnings.
B577 Yield and Composition of Corn Forage as Influenced by Soil Fertilization. 20 p.
C575 How to Farm on the Contour. 6 p.
C593 Grass or Gullies. 20 p. Tells how to build and maintain grass waterways.
C604 Shall We Fall-Plow or Spring-Plow in Northeastern Illinois? 8 p.
C663 Handling Northeastern Illinois Soils. 16 p.
C667 Protecting Your Soil. 24 p. A brief guide to sound conservation practices.
C721 Limestone--How to Use It, When to Use It, Where to Use It. 12 p.
C734 Plain Talk About Soil Management. 16p.
C758 Understanding Soils. 40 p.

(Continued)

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Soils (Cont.)

C765	Potassium - When to Use It, Where to Use It, How to Use It. 12 p.
C777	The Morrow Plots. 18 p.
C787	Watch Your Soil Tilth. 8 p.
SR77	Henderson County Soils. 6 p.
SR78	Lawrence County Soils. 92 p.
AG1562	What's in the Fertilizer Bag?
AG1571	Nitrogen Fertilizers - What They Are and How They Act
AG1578	Effect of Cropping Systems on Corn Yields and on Physical Properties of Some Dark-Colored Soils
AG1588	Nitrogen Recommendations
AG1699	Sixteen Years of Soil Improvement at Brownstown Experiment Station
AG1705	Effect of Nitrogen Fertilizer and Legume Catch Crops Used With a Rotation
AG1710	Northern Illinois Experiment Field
AG1711	Nitrogen Composition of Grain and Stover From Nitrogen Soil Test Locations, 1955
AG1712	Winter Application of Nitrogen Fertilizer
AG1731	Available Water-Holding Capacity of Some Illinois Soils
AG1732	Five Suggested Plans for Simple Fertility Demonstrations
AG1733	What the Soil Tests Tell You
AG1770	Fertilizer, Fertilizer Materials and Rock Phosphates in Illinois. 1-1-57 to 6-30-57
AG1752	Rotations, Phosphates, Nitrogen, Agronomy Farm - Urbana
AG1754	McNabb Soil Experiment Field With a Summary of Results on 12 Dark Soil Fields
AG1755	Hartsburg Soil Experiment Field " " " " "
AG1756	Carlinville Soil Experiment Field " " " " "
AG1757	Minonk Soil Experiment Field " " " " "
AG1758	Carthage Soil Experiment Field " " " " "
AG1759	Aledo Soil Experiment Field " " " " "
AG1760	Dixon Soil Experiment Field " " " " "
AG1761	Northern Illinois Experiment Field--Description & 1957 Research
AG1765a	Clayton Soil Experiment Field With a Summary of Results on 12 Dark Soil Fields
AG1765b	Kewanee Soil Experiment Field " " " " "
AG1765c	Mt. Morris Soil Experiment Field " " " " "
AG1765d	Joliet Soil Experiment Field " " " " "
AG1769	Guide to Northeastern Illinois Agronomic Research Center (Elwood)

General

	Agronomy News. Timely releases of current agronomic research results
	Agronomy Facts, Vol. 1, Vol. 2, Vol. 3, and Vol. 4 (Charge) Compilation of brief articles on pertinent agronomic topics
	1958 Crop Varieties for Illinois (chart 35" x 21")
	Chemical Weed Control for Illinois (chart 35" x 21")
AG1737	Graduate Study in Agronomy. Brochure for prospective students

For topics not covered here or for more specific information, write to the University of Illinois College of Agriculture, Urbana, Illinois. Also watch the Agronomy News for the latest publications of your Agronomy Department and, if possible, tune in to WILL, the University of Illinois Station, for agronomy topics to be heard Monday of each week from 12:15 to 1:00 p.m. on the Illinois Farm Hour.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 28, 1958

RECEIVED
No. 79

RATE AND DATE OF PLANTING CORN

Rate of planting for maximum yields

Overplanting corn can be just as serious a mistake as underplanting. A high yield cannot be obtained without a large corn plant population; however, a large number of plants per acre is no guarantee of high yield. Several factors influence the proper rate of planting corn to get the highest yield. Two of the most important ones are soil productivity and weather conditions. The more productive the soil, the greater the plant population must be in order to obtain maximum yield.

If corn is planted too thinly on productive soil, large ears are produced, and sometimes single plants will produce two ears. As the number of plants increase on a given area, the amount of grain produced per plant decreases. To a certain point, however, the decrease in each plant's production is less than the increase in total yield resulting from the increased number of plants. When the population is further increased, a point is finally reached where the decrease in ear size is great enough to more than offset the gain obtained from the higher number of ears. Therefore, the population that produces the ears without reducing the per acre yield is the correct rate to use to get highest yield. The correct size of ear is about one-half pound for the central corn-belt hybrids. In states north of Illinois, the ear size associated with highest yield is smaller than one-half pound.

Research has shown that the planting rate of corn affects not only grain yield, but other parts of the plant as well. Thickly planted corn produces more slender stalks, and the result is more plants on the ground at harvest time. Corn planted at high rates produces small kernels as well as smaller ears and also a lower percentage of flat, blocky kernels than the same hybrid planted at lower rates on soil of the same productive level. Also, the protein and oil content of corn grain will decrease as the plant population increases.

With optimum ear size of one-half pound and plant establishment of 87.5 percent of the kernels planted, the following planting rates may be used as a guide for maximum yields: If the field will produce about 50 bushels of corn per acre under moderately favorable conditions, plant approximately 8,200 kernels per acre. In a field that presently will produce about 75 bushels an acre, plant approximately 12,400 kernels per acre. In a field producing 100 bushels per acre, the rate should be about 16,200 kernels per acre. For fields that produce yields between those indicated, add approximately 160 kernels per acre for each bushel of corn the field will produce above the yields given here.

Date of planting

The date corn is planted will affect grain yield, percentage of moisture in the grain, and plant lodging. The Illinois Agricultural Experiment Station conducted an experiment to show the effect that time of planting has upon these factors. The table below contains the average results from five years of testing three corn hybrids planted at six different dates.

Average date of planting	Yield of grain bu/A	Moisture in grain at harvest* percent	Plants erect when harvested* percent
May 4	112	18.3	80.4
" 12	108	19.5	79.5
" 19	111	20.7	78.4
" 27	110	21.5	69.6
June 3	101	23.5	66.6
" 12	89	25.5	54.0

*This column shows the average for only four years.

The drop in yield for the May 12 planting is believed to be due to chance. These results show that grain yield is high for all plantings made in May. A significant drop did not occur until the June 3 planting. Harvesting was done in late November or early December to permit the sappy ears to dry out. However, even this delay was not enough to bring the moisture down in the kernels of corn that was planted on May 27.

Corn stalks stand a little better if planted early. Two factors may play a part here: (1) Stalks of early-planted corn have a chance to become fully matured and hence stiffer than those of later plantings. (2) In some years early-planted corn will not grow so tall as corn planted later. The extra height of the later planted corn, along with the added weight of the immature tissue in the green stalk, handicaps the plant when it has to resist strong autumn winds.

For information about recommended varieties, request Bulletin 622, "1957 Performance of Corn Hybrids in Illinois," from the University of Illinois College of Agriculture, Urbana, Illinois.

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AGRONOMY

CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

URBANA

May 5, 1958

No. 80

MINIMUM-TILLAGE SUGGESTIONS FOR USE WITH CORN AND SOYBEANS

How many times do you go over your fields to grow a crop of corn? Most Illinois farmers make at least 10 trips over the field: plow, disk, disk, harrow, plant, rotary hoe, spray, cultivate two or three times, and harvest. The idea behind minimum tillage is to eliminate some of these trips, specifically the ones involved in preparing the seedbed.

If you have not tried minimum tillage and want to get some experience, set aside part of a field -- about 16 to 20 rows -- and try one of the following practices. In this way you can make comparisons throughout the growing season with the rest of the field that was tilled conventionally. Your minimum-tillage operation will differ depending on whether the field was plowed early or just before planting.

Fields plowed in the fall or early spring

If you do not want to delay plowing until near planting time, you can adapt the following methods to fit fields that are plowed in the fall or early spring. Fall-plowed fields present two problems: (1) weeds and (2) rough, uneven ground. Research shows that one disking just before planting will reduce annual weeds just as effectively as disking every two or three weeks until planting time. Therefore, one thorough disking or field cultivator operation should control weeds and level the field enough to make it possible to plant with an ordinary 4-row planter.

Another way to eliminate one trip over the field is to mount the cultivator bar on the tractor at planting time and add enough sweeps or shovels to kill weeds and level the surface. This once-over method is suited to plowed fields where the surface is not unusually rough.

On spring-plowed fields that have not been mellowed and firmed down by spring rains, mounting some type of wheel on the cultivator toolbar or directly ahead of the planter shoe would provide insurance of getting an adequate seedbed in the row.

If weeds become very large because of a wet spring and delayed planting, disk the field once when the weeds are 10 to 12 inches tall.

Fields plowed immediately before planting

In using minimum-tillage methods on fields that are to be plowed shortly before planting, success will depend on (1) doing a good job of plowing and (2) preparing an adequate seedbed within the row.

(Continued)

Use a conventional moldboard plow equipped to cover trash. Such attachments as cover boards, jointers, etc., will help to provide a good seedbed for planting. The surface should be trash free and pulverized as much as possible by the plow. The faster the plowing, the greater will be the pulverization and leveling of the furrow slices. If the plowed ground is extremely rough, it may be advisable to use a spike-tooth harrow or similar light-tillage tool between plowing and planting.

If you are using the plow-and-plant method, plant immediately on the plowed ground before the ground begins to dry out. A heavy-weight planter is preferable, and planters equipped with disk furrow openers will do the best job. The disk openers are not always necessary, but they move large clods away from the row and usually give a more uniform planting depth.

After you have planted a short distance on the plowed ground, examine the seedbed. Corn seed should be 1 1/2 to 2 1/2 inches deep and surrounded by moist soil, with only very small air pockets within two inches of the seed. Soybeans should be no deeper than 2 inches. If necessary, add weight on the planter to firm the soil around the seed. On some planters the press wheels can be adjusted to provide more or less pressure. If planting appears too shallow or seed is visible on the surface, plant deeper and use more weight on the planter. After the corn comes up and the surface looks too rough for close cultivation, do not hesitate to use a rotary hoe or a spike-tooth harrow on the field.

From time to time throughout the summer, note the following items when comparing plants in fields prepared by the two methods (conventional and minimum tillage): (1) root growth, (2) surface and subsurface moisture, (3) color and height of the plants, (4) weed growth, and (5) population or plant stand.

To get a yield estimate, pick four to eight rows the full length of the field, and weigh. If maturity appears to vary significantly, a moisture check would be desirable. Remember that a small decrease in grain yield from the rows prepared by minimum tillage is not a disadvantage because you do save time and costs in operating the tractor.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 12, 1958

No. 81

AGRONOMY EVENTS
Experiment Field Meetings

<u>Date</u>	<u>Field</u>	<u>County</u>
May 22	Enfield	White
May 23	Carbondale	Jackson
May 26	Raleigh	Saline
May 27	Ewing	Franklin
June 9	West Salem	Edwards
June 10	Newton	Jasper
June 11	Toledo	Cumberland
June 12	Carlinville	Macoupin
June 13	Hartsburg	Logan
June 24	Minonk	Woodford
June 25	Aledo	Mercer
July 8	Dixon	Lee
July 9	Mt. Morris	Ogle
July 10	DeKalb	DeKalb
August 22	Oblong	Crawford
September 4	Newton	Jasper
September 5	Toledo	Cumberland
September 11	Urbana - Agronomy Day	Champaign
September 12	Brownstown	Fayette
September 16	Elwood and Joliet	Will
September 17	Carthage	Hancock
September 18	Clayton	Adams

Other Events

<u>Date</u>	<u>Event</u>	<u>Place</u>
June 3-6	Farm Advisers' Conference	Urbana
June 9-13	Grain Dealers' Bookkeeping School	Urbana
June 16-19	Illinois Vocational Agriculture Teachers Summer Conference	Urbana
June 17	Annual Meeting of Illinois Crop Improvement Association	Urbana
June 18	Annual Field Day, Illinois Seed Dealers and Illinois Crop Improvement Association	Urbana
June 24	F.F.A. State Judging Contests	Urbana

<u>Date</u>	<u>Event</u>	<u>Place</u>
July 1	State 4-H Judging Contest	Urbana
August 4-8	Annual Meeting of American Society of Agronomy	Purdue University
August 8-17	State Fair	Springfield
August 21	State Sports Festival	Urbana
September 4	Dairy Day	Urbana
September 10	Annual Field Day, Illinois Seed Pro- ducers Association	Urbana
September 11	Annual Agronomy Day for Farmers	Urbana
November 10-13	I.A.A. Annual Meeting	Urbana
December 6	International Livestock Show	Chicago

Agronomy Day

On the 11th of September, the second annual Agronomy Day will be held. Last year the first annual Agronomy Day was held on June 27. The change of dates this year will provide a better opportunity for you to see just what is taking place in the corn and soybean experiments. A later issue of the Agronomy News will contain the program for the Agronomy Day.

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NEWS

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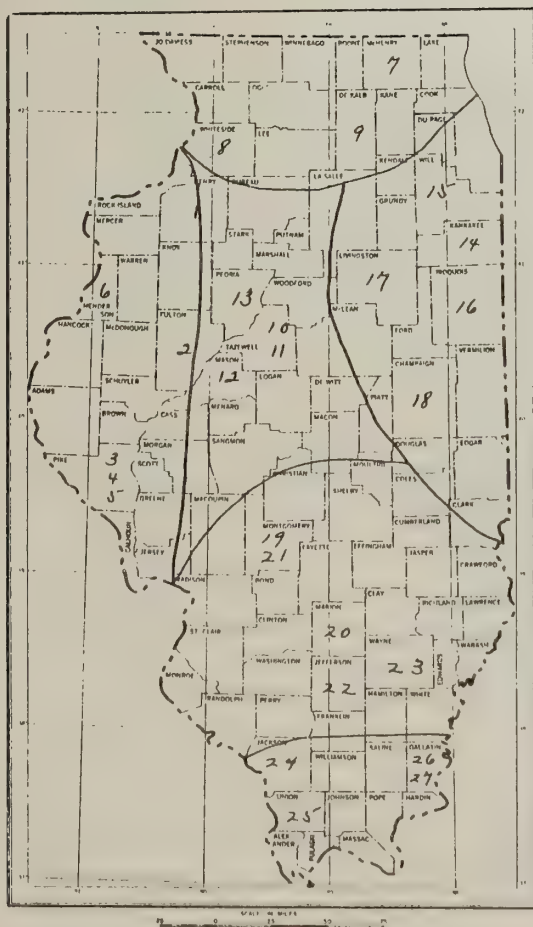
URBANA

May 14, 1958

THE SOIL MOISTURE SITUATION IN ILLINOIS - 1958

No. 182

The following map shows the sample sites of a soil moisture sampling conducted during the week of April 15-19. The results of this survey are shown in Table 1.



The western part of the state showed a subsoil moisture deficit of approximately 20 percent, and in normal years this deficit will not be overcome. As the season progresses, evaporation and plant use will equal or exceed normal rainfall. In south-central Illinois soil moisture is uniformly high, as was true in 1957. Farmers in this area may find it difficult to get into fields for planting. The moisture deficiency in the extreme southern tip is not considered serious in light of the high moisture-holding capacities of the soils in this area and expected potential rainfall.

Table 1.--Results of soil moisture sampling

Location of sample	Soil type	Inches of available water in upper 51 inches of soil		
		Normal	This sample	Deficiency or excess
1	Fayette silt loam	11.8	8.0	-3.8
2	Clinton silt loam	13.6	8.7	-4.9
3	Herrick silt loam	12.4	7.9	-4.5
4	Clary silt loam	12.0	7.8	-4.2
5	Clary silt loam	11.6	7.5	-4.1
6	Huntsville silt loam	10.8	10.6	-0.2
7	Ringwood silt loam	7.2	6.0	-1.2
8	Sawmill silty clay loam	6.6	7.3	+0.7
9	Saybrook silt loam	8.8	8.9	+0.1
10	Sumner fine sandy loam	2.9	6.4	+3.5
11	Muscatine silt loam	9.8	9.4	-0.4
12	Onarga fine sandy loam	6.4	7.2	+0.8
13	Tama silt loam	11.4	9.6	-1.8
14	Watseka loamy fine sand	2.1	8.1	+6.0
15	Drummer silty clay loam	10.0	7.4	-2.6
16	Ashkum silty clay loam	8.9	7.3	-1.6
17	Swygert silt loam	7.7	4.1	-3.6
18	Sidell silt loam	10.6	10.0	-0.6
19	Cowden silt loam	11.5	11.3	-0.2
20	Cisne silt loam	12.2	16.0	+4.2
21	Herrick silt loam	10.6	10.6	--
22	Bluford silt loam	16.0	16.5	+0.5
23	Bonnie silt loam	15.7	16.5	+1.2
24	Menfro silt loam	13.0	9.7	-3.3
25	Tice silty clay loam	11.5	8.1	-3.4
26	Patton silty clay loam	9.9	8.8	-1.1
27	Bonpas silty clay loam	9.1	10.0	+0.9

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 26, 1958

SORGHUM ALMUM AND QUAKER COMFREY^{1/}

No. 83

Sorghum alnum, also called Columbusgrass, Sorgo negro, or Sudan negro, was first described in 1943 by an Argentine scientist. According to available evidence, the grass is a hybrid between Johnsongrass and some other sorghum. For the last twelve years it has been grown on various experiment stations in the South and Southwest.

Description: Sorghum alnum is not uniform, but it may be compared to Johnsongrass. The plants are usually taller than Johnsongrass, the leaves wider, the stems larger, and the heads longer and more spreading. The rhizomes are short, thick, and turn up close to the crown. (No trouble has been reported in killing the plant by plowing.) Regrowth comes mainly from buds at nodes just above the ground--few new shoots arise from the rhizomes. The stalks are pithy and non-sweet. The seed is the same color and shape as Johnsongrass seed. Even though the seed is generally larger, there will be some overlap in size; therefore it is very difficult to identify. Sorghum alnum does not appear to cross readily with cultivated sorghums, but some plants will cross freely with Johnsongrass.

Oklahoma and Texas report that the crop behaved as a perennial only where winters were not severe. Dr. Hittle of our department reports that Sorghum alnum did not overwinter at Urbana in 1956 or at Carbondale in 1957.

Yield: Even though data from yield trials are quite variable, there is no conclusive evidence that Sorghum alnum is superior to Sudangrass in production. In addition, the harvested forage is coarse and drier than that of Sudangrass.

Indications are that this plant is similar to Johnsongrass in regard to prussic acid poisoning.

Does sorghum alnum have a place in Illinois? It would appear that it has a low potential as a pasture or hay plant in Illinois because (1) at present it does not seem to be winter-hardy; (2) yield data from other states indicate that Sudangrass will yield as much forage and sometimes more; and (3) new varieties of Sudangrass are more resistant to leaf diseases and may be more palatable than sorghum alnum.

Quaker comfrey, also called Russian comfrey (*Symphytum peregrinum*) belongs to a large family of mucilaginous and slightly bitter plants which includes heliotrope, hound's tongue, stickseed, and Gromwell.

^{1/} Based on reports by J. R. Harlan, Oklahoma Experiment Station; E. M. Trew, Texas Extension Service; and Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture.

(Continued on other side)

A similar plant, prickly comfrey, received a considerable amount of publicity as a forage plant around the turn of the century. Researchers at the USDA and several state experiment stations, after studying this plant, concluded that it did not have a place as a forage plant in the United States. The green-matter yields were high under favorable conditions, but the quality and dry-weight yields were inferior to those of our common forage plants. Silage was of poor quality because of the watery, gummy nature of the leaves.

Recently the interest shown in Quaker comfrey has been scattered. It is reported to be higher yielding than prickly comfrey, yielding up to 120 tons of green matter per acre. However, further checking of the literature suggests that these yields were obtained from a few plants grown under garden conditions.

Quaker comfrey is propagated from root cuttings and is usually spaced on three-foot centers. For optimum yields the crop should be cultivated and grown in soil with a high level of fertility. Cost of planting, disadvantages of grazing spaced plants, and unsuitability for hay or silage would seem to limit its use to soiling. Experimental plantings in the United States have shown that growth during the year of establishment has been modest, and indications are that cattle and swine will have to be induced to eat it.

No recommendations can now be made. Experimental plantings have been made at several locations in the United States; however, they have not been established long enough to warrant definite recommendations. Dr. Hittle established a small planting of this crop on the Agronomy Farm in May 1956. A small patch (15 plants spaced 3 feet each way) was harvested on June 7, 1957. When expanded to an acre basis, the yield was 26.6 tons of green forage per acre. The plants averaged only 14 percent dry matter; therefore, on a dry-weight basis the yield was 3.73 tons per acre. This was the only harvest made in 1957. No feeding trial has been conducted and no chemical analysis was made of the crop.

Both Sorghum alnum and Quaker comfrey can be seen at the Agronomy South Farm this summer.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

June 2, 1958

No. 84

TWO NEW CORN HYBRIDS WITH HIGH OIL AND HIGH PROTEIN CONTENT

Your Agronomy Department has developed two corn hybrids, Ill. 6021 and Ill. 6052, that will soon be available to farmers. The outstanding difference between these two hybrids and standard hybrids used today is that they both average about 25 percent more oil and 10 percent more protein; however, they are similar to standard hybrids in grain yield, standability, and other agronomic traits. Comparisons of Ill. 6021 and Ill. 6052 with U. S. 13, a standard hybrid, are shown in the following table:

Four-year average taken at Urbana

Entry	Oil			Protein		
	%	% of U. S. 13	Lb. per A.	%	% of U. S. 13	Lb. per A.
Ill. 6021	6.24	127	387	11.4	108	703
Ill. 6052	6.23	127	384	11.9	112	729
U. S. 13	4.92	100	318	10.6	100	681

Agronomic traits

Entry	Bu./A.	% moist. in grain	Shell-ing %	Erect plants %	Days to half silk	Oil & protein % of U. S. 13
Ill. 6021	111	21	79	86	75	125
Ill. 6052	111	22	80	81	74	128
U. S. 13	115	20	80	87	74	100

Development of these two hybrids is the result, but not the conclusion, of years of breeding and testing. High oil and protein contents were transferred to standard inbred lines by backcrossing, selection, and self-fertilization. Selection for high oil was accomplished by selecting ears bearing kernels with large germs. Selection for high protein included selecting ears with hard, flinty kernels.

Four main steps to follow before getting the seed to the farmer

1. The first and most difficult step has already been accomplished. The task of developing and testing the hybrids was successfully completed in 1957. Also in 1957 the four inbreds that make up the double-crosses for the two hybrids were increased considerably. Even though the task of developing these two hybrids has been successful, it by no means is concluded. New hybrid combinations will constantly be tested.
2. The second step will be conducted this year by the Illinois Seed Producers Association. They will produce the foundation single-cross seed from the inbreds.
3. The third step will take place in 1959. The foundation single-cross seed should be available to seedsmen in the winter of 1958-59. From the single crosses the hybrid seed will be produced.
4. The fourth and final step is making the hybrid seed available to the farmer. This should take place in 1960.

Why spend time in developing a high-oil and high-protein corn hybrid?

Corn oil is a valuable by-product of the starch industry, and it is high in energy value for livestock feeding. Most of the oil is in the germ of the kernel. The high-oil hybrids have a high proportion of germ to endosperm; consequently, they should benefit both the starch industry and livestock feeders.

Corn oil finds many uses

The nutritional properties of refined corn oil make it a valuable food. It is easy to digest and contains some of the rare oily compounds now classified, like the vitamins, among the protective foods. Corn oil can be used in bakery products, cooking oil, oleomargarine, mayonnaise, salad dressing, pharmaceuticals, shortening, and soups. The medical profession is interested in the possibility of adding more corn oil to the human diet because it appears to absorb cholesterol in the blood. Non-food uses of refined corn oil include ammunition, chemicals, paint, varnish, rubber substitutes, rust preventive, soap, soluble oil, and textiles.

Uses of protein

Protein is an expensive but necessary constituent of both food and feed. Its quality is fully as important as its quantity. The corn kernel contains two types of protein. One type, found in the endosperm, is primarily zein. Zein is deficient in tryptophane and lysine, which are essential for animal nutrition. However, zein has been used to produce "Vicara," a fiber that is used in blends with wool. The other type of protein, which is found in both endosperm and germ, contains both tryptophane and lysine and is biologically balanced. Corn breeders would like to increase the percentage of these amino acids in the endosperm protein. The alternative is to add them to the diet from other sources.

These two new hybrids along with many others may be seen this summer at the Agronomy South Farm in Urbana. Please note that seed for these two hybrids, Ill. 6021 and 6052, will not be available before 1960.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

JUN 10 1958

JUN 10 1958 No. 85

June 9, 1958

SUGGESTIONS FOR MAILING PLANT SPECIMENS

Starting in early spring your Agronomy Department and local farm advisers begin receiving plant specimens mailed in by farmers. From spring until next fall it is expected that many requests for identification of plant diseases, nutritional deficiencies, weeds, crop plants, and insect damage will be received.

What is needed for identification

Many times, when plant specimens arrive, there is nothing but a dried-up, leafless stem and a lot of broken and shattered leaves in the bottom of the envelope. The specimens were ruined in transit because the sender failed to take proper precautions to preserve them before mailing. In such case identification is difficult at best, and often impossible.

To insure accurate identification, the specimen should arrive in a fresh condition, with the leaves unshattered and still attached to the stem. The entire plant should be mailed, because the roots, stems, and leaves all are needed to aid in positive identification. In addition, floral and seed parts, if they have formed, will help a great deal.

Preparation for mailing

You can help your Agronomy Department and local farm advisers to help you by following these suggestions for preparing specimens for mailing:

1. Select a specimen that appears to be typical of the weed, disease, deficiency, or insect damage you want identified. If possible, in cases of disease, send two or more plants in different stages of the disease.
2. In most cases a green specimen in fresh condition is needed for identification. Do not merely stick the plant in an envelope and mail it. Instead, wrap the roots and soil in newspaper so that the soil will not get all over the leaves and floral parts in transit. Place the specimen in a plastic freezer bag or locker bag or a similar moisture-proof container, and seal it. Then put the plastic bag in a mailing tube, if obtainable, or a box, or some other sturdy packaging.

If a weed or crop plant is to be identified, a second, but poorer, method is to place the specimen between two pieces of cardboard and then put it in a large envelope or wrap it securely.

In either method, if the plant is tall it may be cut into several sections. Be sure to include the roots, as well as the vegetative parts, and the floral and seed parts if they are present.

Send this information with your specimens

1. How widespread is the condition or plant to be identified? Did it just start? Is it spreading fast?
2. What crop is growing in the field from which the specimen was taken? Give variety name if known. What crop was grown in the same field last year?
3. Where was the specimen located in the field (in the center; along the fencerow)?
4. From what kind of soil was the specimen taken (sandy, clay, well drained, poorly drained)? How much fertilizer has been applied in the last few years; how much lime?

When and where to send plant specimens

To avoid delay in delivery due to slower postal handling over week ends, try to prepare and mail plant specimens early in the week, preferably on Monday. For prompt delivery, be sure to put your name and address on the package.

You may send plant specimens either to your farm adviser at your County Extension Office or to your College of Agriculture at the following addresses:

Plant specimens for identifying insect damage may be sent to Dr. H. B. Petty, Extension Entomologist, 280 Natural Resources Building, University of Illinois, Urbana, Illinois.

Plant specimens for identifying plant diseases may be sent to Dr. W. M. Bever, Professor of Plant Pathology, 218 Mumford Hall, University of Illinois, Urbana, Illinois.

Plant specimens for identifying nutritional deficiencies, weeds, or crop plants may be sent to Crops Extension, 213 Davenport Hall, University of Illinois, Urbana, Illinois.

Correction: The annual meeting of the IAA will be held November 17-20 in Chicago instead of the time and place given in Agronomy News 81.

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Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 2, 1958

No. 86

SEE THE LATEST RESEARCH IN CROPS AND SOILS

For the latest developments in crops and soils research, your Agronomy Department invites you to attend the:

SECOND ANNUAL AGRONOMY DAY

September 11, 1958

9:30 a.m. DST

at the

AGRONOMY SOUTH FARM, URBANA

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SEP 4 1958

DEPARTMENT OF FORESTRY

Over 1,200 farmers and others interested in keeping up to date on results of research in agronomy attended the first annual Agronomy Day in June of last year. Your many fine comments have encouraged us to continue this program as an annual affair.

Last year research in small grains and forage crops was emphasized. This year the date has been changed to September, and corn and soybean research will be featured in the tours. Members of the agronomy staff and some others from closely associated departments will be on hand to tell you about the latest field research.

Program booklets will be handed out that contain brief write-ups for your use as reference in viewing the research work. In case of rain, arrangements are being made to hold the entire program in the Stock Pavilion.

Be sure to bring a picnic lunch. Dr. Louis B. Howard, Dean of the College of Agriculture, will talk to us as part of the noon-hour activities. Soft drinks and ice cream will be sold on the grounds by the Field and Furrow Club, our undergraduate student club, which has been voted the most outstanding agronomy student club in the nation three times during the past four years.

Here is a brief run-down of the research that will be explained to you on Agronomy Day: You will see corn hybrids which you may be growing in the near future. These hybrids contain up to 25% more oil and 10% more protein and still yield as well as the hybrids in common use today. The corn breeders will also present some hybrids that have outyielded conventional hybrids when both are planted as thickly as 24,000 plants per acre. You will also see the much-talked-about dwarf corn hybrids, which lodge much less than normal hybrids; as a result, machine harvesting should leave proportionately less corn in the field. You will hear about a large collection of different types of corn from which seed samples have been sent to many states and foreign countries. Research on why a corn plant produces only one or two ears will be presented.

Soybean growers will want to see the new varieties and learn how they compare with other varieties recommended for Illinois. At another tour stop you will see about 3,000 strains of soybeans and hear how plant breeders use them in developing improved varieties. Research in developing varieties with resistance to

(Continued)

certain diseases will be explained at another stop. You will also see work in progress aimed at determining the best time and method of planting soybeans to get highest yields.

Alfalfa varieties will be on display so that you can see and hear about the ones now available for use in Illinois. The plant breeders will also show their work on grain sorghums and broomcorn. You will want to hear about the remarkable features of a chemical called gibberellic acid. Research is in progress to see whether this chemical would be valuable for use on corn and soybeans.

You will want to see how tests are designed to learn how much water is needed to produce a crop of corn or soybeans. The depths at which corn roots feed in different soils under different conditions will be shown. You will see how corn and soybeans can be produced at less cost and still yield as well with minimum tillage as under normal cultivation.

Soils research workers will also be showing the results of an experiment begun in 1945 to compare the effects of phosphate and nitrogen when used in two different crop rotations. Many of you will be interested in a two-year study to see how much corn benefited from applying nitrogen fertilizers during the winter rather than in the spring.

You can readily see that the 17 tour stops will present many interesting things that will make attendance at Agronomy Day very much worth while. The tours will begin at 9:30 a.m. Daylight Saving Time and will recess for lunch and noon-hour activities. They will begin again about 1:30 p.m. and should end about the middle of the afternoon.

In addition to the stops on the Agronomy Farm, you will also have the opportunity to view the world-famous Morrow Plots, the oldest soil experiment field in America, where research records date back to 1876. Plans are being made to have someone at the Morrow Plots between 3 and 5 p.m. to answer questions concerning this historically important area located near the center of the campus.

We hope you will tell all of your friends about Agronomy Day. Be sure to remind them to bring their lunch.

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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

SEP 9 1958

DEPARTMENT OF AGRICULTURE
No. 87

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

September 8, 1958

PREHARVEST CHEMICAL DRYING AND MECHANICAL TOPPING OF FIELD CROPS

Preharvest drying with chemicals

Near the end of the growing season there is frequently some interest in the use of chemicals for hastening the field drying of crops. Illinois tests indicate that the most important reason for using desiccants in our fall-maturing crops is to dry up green weeds that would otherwise not die until frost. Research has shown that when a preharvest drying chemical is applied before the crop has reached its maximum dry weight (physiological maturity), yield and quality are reduced, often quite severely.

Preharvest chemical drying has been tried on soybeans, corn, grain sorghum, and legumes. The conclusion from this research has been that this practice has little practical value, for the most part, in Illinois.

Preharvest spraying of soybeans might be worth while considering when the presence of a rank growth of green weeds would make harvesting difficult. But such treatment should not be used on soybeans until after the leaves and pods turn yellow and the lower leaves start to drop. Chemical treatment of corn has not appreciably hastened preharvest drying of the grain. Recent tests at Urbana with grain sorghums have also failed to show practical benefits from the use of drying chemicals.

The best possibilities for practical use of crop desiccants appear to be in harvesting legumes for seed. The most interest along this line in Illinois has been in red clover. Seed yields are usually not great enough in Illinois, however, to justify the expense of using desiccants.

A number of different preharvest drying chemicals are now available. But most of them have not been approved by the Food and Drug Administration for use on food or feed crops.

Corn topping

From 1950 to 1952, research was conducted at Urbana to determine the value of mechanical topping for hastening the field drying of corn. These studies showed that mechanical topping, like chemical top-killing, had only a minor effect in reducing moisture content to a safe storage level. If topping is done before the corn is actually mature (around 30 to 35 percent moisture), then yield is apt to be reduced.

(Continued on other side)

Even though corn topping may not be practical from the standpoint of field drying, certain harvesting advantages may be realized from it. Although we have no data to provide evidence, some farmers have reported such advantages as less lodging, easier picking (less clogging of the snapping rolls), cleaner picking with less trash in the corn, and better shelling efficiency if harvesting is done with a combine.

If you are interested in corn topping, you may wish to try it on a small scale in your own field this fall. Somewhere away from the edge of the field, top a small part of two or four rows by hand just above the ear. When you harvest the corn, note any differences in lodging, ease of harvesting, or other traits. If possible, compare yields of the topped rows with those of the same amount of untopped corn next to them. Your farm adviser would undoubtedly like to know the results of such a test. It might be best to contact him beforehand so that he could give you some pointers on how to set up an easy field trial on corn topping. Your Agronomy Department would also be interested in the results of such a test.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 22, 1958

No. 88

WINTER BARLEY IN ILLINOIS

The popularity of winter barley among southern Illinois farmers seems to be increasing. Let us examine some of the possible reasons for this change.

Even though barley rates below corn in feeding value for fattening animals, it is just as good as corn for growing animals. For best results barley should be cracked before feeding because the whole grain is hard for animals to digest. Fine grinding makes barley less palatable.

Winter barley harvested in June is good feed insurance against low corn yields or complete corn failures such as occurred in Illinois drouth areas in 1954. It is less likely to be caught by drouth than corn because it grows at a time of year when the supply of water is most likely to be adequate. In southern Illinois, barley often yields as much as corn and oats, producing 50 to 70 bushels an acre. It also costs 30 percent less to produce an acre of barley than an acre of corn. Besides having these advantages, barley produces excellent fall and early spring pastures, it is a good companion crop for legumes, it is a good crop for controlling soil erosion, and it fits well into rotations.

Following are some key practices that will help to insure high yields of winter barley:

1. Choose a winter-hardy variety.
2. Prepare a good seedbed in fertile soil, applying soluble phosphates as the crop is planted.
3. Clean and treat the seed before planting.
4. Sow barley two weeks earlier than wheat.
5. Plant with a drill at the rate of two bushels an acre.
6. Control insects, such as armyworms and chinchbugs, at the earliest signs of infestation.

1958 Yields

Here are the yields from performance trials conducted at four locations in Illinois. The results from Carbondale were not yet available. Yields are given for 1958 and also as three-year averages for three of the locations.

Variety	No. Ill.	Urbana		Brownstown		Eldorado	
	Field	3 yr.		3 yr.		3 yr.	
	(DeKalb)	1958	1956-58	1958	1956-58	1958	1956-58
*Kentucky #1	71	96	85	76	64	75	68
*Kenbar	69	78	77	75	60	74	71
*Mo. B-475	80	87	85	84	68	67	60
*Hudson	73	104	89	84	66	79	69
*Dayton	65	79	76	88	66	72	66
Kearney	58	80	72	66	54	56	45
Decatur	78	79	78	56	58	70	67
Kenate	70	92	85	88	69	73	69

* Varieties recommended for Illinois.

If the five recommended varieties were listed in order of yield in these trials, they would rank as follows: Hudson, Mo. B-475, Kentucky #1, Kenbar, and Dayton. Hudson, Kenbar, and Dayton have the best straw strength. Kenbar and Dayton are less winter-hardy than the others and should therefore be grown only in extreme southern Illinois. It has only been in recent years that plant breeders have developed varieties that are both winter-hardy and stand well. This change makes it possible to recommend winter barley for growth as far north as Urbana. During mild winters or when protected by snow at critical periods, the crop has ever yielded well in some areas farther north, but the chances of winterkilling are too great to recommend its use there.

Mo. B-475 is a fairly new variety, but a reasonably good supply of seed will probably be available this year. Dayton is a new variety that has not previously been recommended for Illinois.

If you are interested in more information about winter barley, contact your county farm adviser or write the University of Illinois College of Agriculture, Urbana for Circular 782, "Winter Barley, a Feed Insurance Crop for Southern Illinois.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 29, 1958

No. 89

1958 WINTER WHEAT YIELDS

Here are the results from the winter wheat performance trials taken from three locations in Illinois. Because of the delayed harvest this year, the data from several stations were not yet available for this report. The average yields in bushels per acre are given for the past two and three years in addition to the 1958 yields.

Variety	No. Ill. Field (DeKalb)			Urbana			Brownstown		
	1958	2 yr. 1957-58	3 yr. 1956-58	1958	2 yr. 1956-57	3 yr. 1956-58	1958	2 yr. 1957-58	3 yr. 1956-58
SOFT WHEATS									
*Knox	44	42	44	31	27	30	42	36	41
*Vermillion	43	38	39	35	28	33	42	35	40
*Dual	43	40	42	38	30	33	41	37	41
*Seneca	42	38	38	33	24	26	50	43	45
*Saline	45	39	39	37	29	34	44	38	43
LaPorte	43	39	--	29	22	--	43	41	--
Lucas	42	38	40	36	27	30	45	37	43
Racine	48	--	--	39	33	--	41	--	--
Todd	42	--	--	35	23	--	35	--	--
HARD WHEATS									
*Triumph	42	41	43	32	26	30	39	--	--
*Pawnee	42	38	40	38	29	35	37	29	35
*Ponca	43	38	41	35	31	35	32	30	37
*Westar	43	36	40	36	25	32	36	26	37
Concho	44	39	41	32	22	29	33	26	35

*Varieties recommended for Illinois.

Wheat yields, in general, were above average this year throughout the state. The delay in harvest due to rainy weather undoubtedly kept them from being even larger. The wet weather during harvest also caused a lot of wheat to sprout before it could be combined.

Susceptible varieties, such as Dual and Knox, were badly diseased by loose smut this year. Loose smut does not reduce the quality of wheat and should not be confused with covered smut (bunt), which does lower quality. The best ways of controlling loose smut are through the use of resistant varieties and seed treatments. No chemicals now in use seem to be effective. If the seed of a susceptible variety is suspected of being infested, it should receive some sort of water-soaking treatment before it is planted. For details on the techniques of treating seed wheat for loose smut, write the Plant Pathology Department, University of Illinois, Urbana, Illinois, for recommendations.

(Continued)

The soft wheats are recommended for southern and south-central Illinois with the exception of Seneca, which should be grown only in the southern part of the state. It has been the top yielder at Brownstown but ranks near the bottom at the central and northern locations. Except for Seneca, there have been very little differences in yield among the recommended soft wheat varieties.

The hard winter wheats are grown in north-central and northern Illinois. Yields for the recommended varieties have been about the same. Triumph has been specified only for central Illinois, but the others are suitable for the southern part of the state as well.

If you are interested in additional information on winter wheat, look back through your Agronomy News issues 27, 59, and 61. You may also wish to obtain the mimeographed series on wheat identified as AG-1766. If your county farm adviser is out of these publications, you may request them directly from the Agronomy Department, University of Illinois, Urbana, Illinois.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

OCT 14 1958

October 13, 1958

No. 90

WILD GARLIC AND WILD ONION CONTROL

Many farmers in Illinois, especially in the southern part of the state, have trouble with wild garlic and wild onion. It has been estimated that these two weeds cost Illinois farmers over half a million dollars a year through dockage in wheat. If the loss of milk and meat products due to reduced quality were added, the cost would be considerably higher. CERTAIN CONTROL MEASURES CAN BE APPLIED AT THIS TIME OF THE YEAR.

HOW TO TELL THE PLANTS APART: Wild onion has flat leaves rising out of the bulb at ground level, whereas wild garlic has cylindrical leaves with the bases sometimes aboveground on stems. Wild garlic has several underground bulbs appearing in clusters; wild onion has only one bulb per plant. Wild garlic has a stronger odor and is a more troublesome weed than wild onion.

LATE FALL PLOWING BIG FACTOR: If you can plow in the late fall without inviting serious erosion, you can smother the young plants that have germinated and prevent the underground garlic bulblets from forming.

Growing a cultivated crop the following season will make it possible to destroy seedlings that may appear in the spring. Three or four years of this program will exhaust all seeds or bulblets that are in the soil.

CHEMICAL CONTROL: If fall plowing causes serious erosion, October and November are an ideal time to apply chemical treatments. Applying 2 to 3 pounds of 2,4-D ester per acre to cornstalk and soybean stubble will give good results. But do not use this treatment on small grains or legumes.

If you find wild garlic in your wheat fields, delay treating with 2,4-D ester until spring AFTER TILLERING BUT BEFORE THE BOOT STAGE. Use 1/2 to 3/4 pound per acre. The amine form of 2,4-D is also satisfactory to use in the spring. Fall applications are harmful to wheat, but 1/2 pound of 2,4-D ester per acre applied about the first week in April has reduced aerial bulblets an average of 50 percent with little adverse effect on wheat yields. The remaining plants have been so deformed that the combine has picked up few of them when the wheat was not lodged. However, this treatment will usually kill or reduce the stand of an underseeded legume.

SUMMARY:

1. Wild garlic and wild onion can be controlled by late fall plowing followed by a cultivated crop.

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2. 2,4-D is effective in destroying wild garlic and wild onion when applied in October or November to cornstalks, soybean stubble, and grass pastures.
3. 2,4-D is most effective when wild garlic is in its early stages of growth.
4. Use CAUTION in applying a chemical treatment to wheat and other small grains. They should be sprayed only in the spring after tillering but before reaching the boot stage. Treatment at other times can seriously injure the crop.

Please note this correction in the preceding issue, No. 89, entitled "1958 Winter Wheat Yields": The next to last paragraph should end as follows: "for the northern part of the state as well."

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October 27, 1958

No. 91

THE ROGUE OF THE SORGHUM FIELD

Grain sorghums continue to attract interest in Illinois. One of the most frequent questions concerns the off-type plants that occur in sorghum fields. These irregular plants are called rogues.

Rogues are of several types and origins. Two of the common sources of rogues are:

1. MUTATIONS
2. HYBRIDS RESULTING FROM CROSSES WITH OTHER MEMBERS OF THE SORGHUM FAMILY

A mutation is the result of a sudden hereditary change. One of the hereditary factors that produces short sorghum plants is rather unstable. A change sometimes occurs that causes the sorghum plants to grow taller than usual. For this reason, one might find a tall sorghum plant in one out of every thousand or two thousand plants. Except for their height, these tall rogues are quite similar to the standard plant of the hybrid that is involved.

Rogues resulting from outcrosses with other sorghum varieties or types are recognized easiest by an increase in height, number of stems, or both. They can usually be distinguished from tall mutations because they differ from the standard in several ways besides height. All such crosses are a nuisance in harvesting and give the field an unattractive, ragged appearance. THE MOST SERIOUS OUTCROSS IS PROBABLY THAT INVOLVING JOHNSONGRASS.

Johnsongrass is in the sorghum family and is therefore related to grain sorghums. It usually does not cross with grain sorghums except where hybrid seed is produced. In hybrid seed production, a few rows of sorghum act as the male plants (pollinators), and several adjoining rows as the female plants. The male-sterile plants are particularly susceptible to being fertilized by pollen from Johnson-grass plants in neighboring fields and fencerows. Sudangrass will cross with sorghums in a similar manner.

How serious these Johnsongrass-like plants are, has not yet been determined. Detailed studies are being made. The biggest danger might lie in overwintering and spreading by rhizomes. It is doubtful that these off-types resembling Johnson-grass will be a problem except where Johnsongrass is already fairly prevalent.

If control measures are needed, the Johnsongrass types could be dug out by the roots. If this is impractical, careful spot treatment with Dowpon, using a knapsack sprayer, would probably be the best approach. This spray should be put on at low pressure and kept off the grain sorghum as much as possible. Good control should be obtained by spraying a mixture containing one pound in six gallons of water on the foliage when it is one to two feet tall. If regrowth occurs, treatment should be repeated when the plants become a foot high.

You may obtain a more technical reference on rogues by writing your Agronomy Department, University of Illinois, Urbana, and asking for Agronomy Facts, M-26, entitled "Rogues in Commercial Hybrid Sorghum."

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URBANA

NOV 21 1958

DEPARTMENT OF FORESTRY

No. 92

November 10, 1958

BASAL BARK AND STUMP TREATMENTS TO CONTROL BRUSH

Within the next few weeks, most of the major autumn work to be done on the farm will be completed. The corn pickers, combines, and wheat drills will have been stored away for the winter, and farmers can begin to catch up on some seasonal chores that need attention. For instance, all that brush along those fence rows and ditches "over on the back forty" should be eliminated if it is serving no worthwhile purpose. We suggest using a chemical brush killer called 2,4,5-T between now and next spring as part of a brush control program. Use of this non-corrosive, nonpoisonous chemical provides a practical and relatively inexpensive way to destroy unwanted woody vegetation.

At this time of year when woody plants become dormant and on through the winter, basal bark and stump treatments with 2,4,5-T are the most effective methods we know of for controlling brush. Dormant-season treatment with 2,4,5-T will control practically all kinds of brush. However, one application seldom achieves 100 percent kill; two or more may be needed to do a complete job on some of the resistant woody plants. If the brush stands for at least a year after treating, the herbicides will penetrate better, lessening the chances of regrowth. If these treatments are used near orchards or ornamental trees and shrubs, spraying should be done when there is very little wind.

The basal bark treatment consists of spraying or painting the lower part of the tree trunk with a mixture containing 4 pounds of the acid (active ingredient) for every 25 gallons of kerosene, diesel oil, or fuel oil. This is about the same as 1/2 pound (1 pint from container) in 3 gallons of oil. It is important to completely encircle the trunk and to cover it thoroughly to a height of 15 inches above the ground line. The mixture should be applied to the trunk until the spray runs down the bark and begins to wet the soil. If the trees are larger than 8 inches in diameter or are a resistant variety, it is advisable to apply some of the solution in frills cut in the bark around the trunk two or three feet above the ground. For such use stronger solutions may be needed.

The basal bark treatment is the most effective way to control brush at any time of the year, although the closer to bud swelling, the more effective it becomes. We are inclined to say that basal spraying gives the best results between December 15 and March 15. This dormant season treatment has the advantage of controlling larger woody plants and also several species, including some oaks and maples, that are resistant to foliage sprays.

The stump treatment is effective for preventing regrowth from brush when 2,4,5-T ester is applied soon after cutting. The recommended mixture is the same as that used for the basal bark treatment. The top as well as the sides of the stumps should be sprayed or painted until the solution begins to run off. As in the

(Continued)

basal method, better kill of large tree stumps and resistant varieties will be obtained by using frills and higher concentrations of the 2,4,5-T solution. Ammate is another chemical that is effective for stump treatments. However, treatments with this chemical often cost more than those with 2,4,5-T and seldom give any better results.

Some precautions are needed when using 2,4,5-T or any other herbicide. When roadsides and fence rows are being sprayed, it is important to make sure that the spray does not drift onto susceptible crops. Regardless of when or where a herbicide is used, it is always wise to follow the manufacturer's directions and to observe cautions given on the container.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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URBANA

November 24, 1958

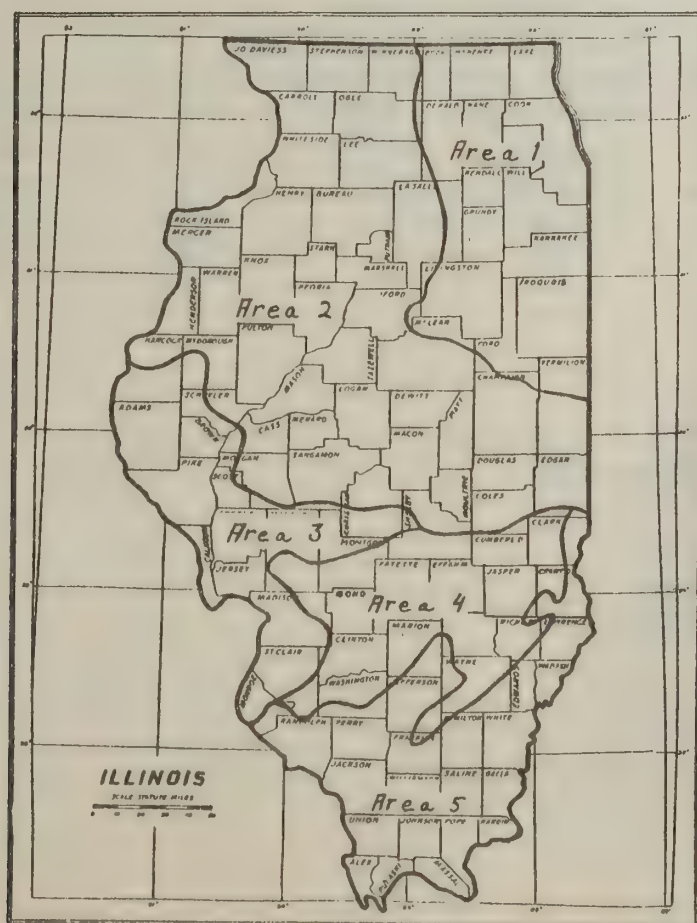
YOUR PRODUCTION POTENTIAL

No. 93

Results of studies over many years indicate that, as yields increase, net costs per bushel go down. Results of recent studies also indicate that Illinois farmers can produce more than they are now producing. Therefore, farmers need to shoot for higher yields in order to get lower costs and the most economical farm operation.

Farmers need to know what potential yields their farms are capable of producing, and how they can manage their soils to make them produce this potential. To give you these facts, the Middle West Soil Improvement Committee of the National Plant Food Institute, located in Chicago, has cooperated with the University of Illinois in publishing a chart entitled "Set Your Sights for High Yields at Low Cost." Checklists have also been prepared to supplement this chart. These checklists are available for each of five general soil-type areas in Illinois. The checklists also give nine important management suggestions to help you get high yields.

According to the two institutions mentioned above, the production potential of Illinois is related to the five general soil-type areas shown on the following map:



The survey indicates that for each of these areas you can get at least these yields:

Area	Corn bu./acre	Soybeans bu./acre	Wheat bu./acre	Oats bu./acre	Hay tons/acre
1	67-94	27-40	24-45	48-67	2.5-3.5
2	73-105	30-40	28-46	48-80	2.1-4.2
3	66-100	30-39	28-42	53-65	2.5-3.8
4	56-80	22-35	22-37	34-49	1.9-3.1
5	50-69	-----	24-35	(winter) 44-64	1.8-3.5

The yields obtained by farmers in any one year may be above or below those given in this table. The differences will be due to variations in the weather. The yields that are listed are the average figures for ten to twelve years of crop production.

Within each of the five areas there is a wide range in yields, which is due to differences in soils and in management. The chart and the checklists give the yields that can be obtained for a number of different soils in each area when good management practices are used. To provide high-level management farmers should:

1. Apply the needed plant nutrients.
2. Use top-quality seed.
3. Use recommended seeding rates.
4. Carefully conserve both soil and moisture.
5. Keep soil in good tilth.
6. Use minimum tillage.
7. Control weeds, insects, and disease.
8. Harvest carefully to save the crop.
9. Store in such a way as to preserve quality.

To get more detailed information, get a checklist for your area from your fertilizer dealer, farm adviser, Vo-Ag teacher, or S.C.S. fieldman. This checklist will tell you how, by identifying the soil types on your farm and following good management practices, you can raise your yields, lower your costs, and reach your production goal.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

December 8, 1958

No. 94

THE RED CLOVER REPORT

Red clover ranks second only to alfalfa as a forage or hay crop in Illinois. Five major uses of red clover are for silage, hay, soil improvement (green manure), pasture, and seed production.

Good Soils Are Important

In the production of red clover we find no exception to the rule that better yields are obtained under good soil management. Red clover will grow on more poorly drained fields than alfalfa, but it is much more productive on well-drained soils that have good tilth. Red clover will not grow on soils that are too acid. Therefore, lime should be added when tests indicate its need. To obtain high yields of red clover, deficient soils should be fertilized to fully provide the necessary plant nutrients.

Summary of Red Clover Yields in Illinois

Northern Illinois Experiment Field - DeKalb County

Year of seeding	1955	1955	1956 ^{a/}	1957	
Year of harvest	1956	1957	1957	1958 ^{b/}	Ave.
	T/A	T/A	T/A	T/A	T/A
Wisconsin Synthetic	3.24	.96	2.24	3.41	2.46
Dollard	2.86	1.06	2.34	3.49	2.44
Certified Kenland	3.09	.70	2.09	2.92	2.20
Common	----	----	2.09	2.98	----

Central Illinois (Agronomy South Farm) - Champaign County

Year of seeding	1955	1955	1956	1956	1957	1957	
Year of harvest	1955	1956 ^{a/}	1956	1957	1957	1958	Ave. ^{c/}
	T/A	T/A	T/A	T/A	T/A	T/A	T/A
Wisconsin Synthetic	3.38	3.79	1.84	3.28	2.01	3.79	3.62
Dollard	2.92	3.87	1.93	3.04	1.99	3.22	3.38
Certified Kenland	3.18	3.81	1.92	3.15	1.88	3.93	3.63
Common	----	----	----	----	1.92	3.83	----

Southern Illinois (Agronomy Research Center) - Jackson County

Year of seeding	1955	1955	1956	
Year of harvest	1955	1956	1957	Ave. ^{c/}
	T/A	T/A	T/A	T/A
Wisconsin Synthetic	1.25	2.20	4.22	3.21
Dollard	1.41	1.50	3.87	2.68
Certified Kenland	1.42	2.23	4.28	3.26
Common	----	----	3.87	----

(Continued)

Explanation of table:

1. Experimental seedings were not made in southern Illinois in 1957, and 1958 yield data are not available.
2. T/A stands for tons per acre.
3. Yields taken first year are from stands established without a companion crop.
4. a/ Slight damage from northern anthracnose in 1956.
b/ Slight damage from northern anthracnose in 1958.
c/ Does not include yields taken during year of seeding.

Varieties

Kenland red clover is recommended for the southern two-thirds of Illinois. This variety has resistance to southern anthracnose (a disease of both stems and leaves that frequently kills the whole plant), is long lived, and frequently produces a second cutting of high-quality hay that is relatively free of weeds.

Dollard red clover is used in the northern two-thirds of Illinois. It is winter-hardy, resistant to northern anthracnose, and tolerant of aphids.

Wisconsin Synthetic is a new unreleased variety. It has not been sufficiently tested in Illinois to make any recommendations concerning its use, and seed supplies are not yet available.

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AGRONOMY

Department of Forestry

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

December 15, 1958

No. 95

SOYBEAN VARIETY TRIALS IN ILLINOIS

Soybean variety trials are conducted at nine locations in the state. These tests furnish direct comparisons among varieties planted at the same time, grown on the same soil and fertility level, and cultivated and harvested in the same manner. The average yields in bushels per acre during the past four years are as follows (varieties listed in order of maturity, early to late):

Region in Illinois:	Northern	North-Central	East-Central	West-Central	South-Central	Southern		Southernmost	
Location	Shabbona	Dwight	Urbana	Girard	Edge-wood	Eldo-rado	Carbon-dale***	Ullin	Miller City
Variety									
*Chippewa	39.3	34.6**	39.4**						
Blackhawk	36.0	35.8	37.8						
*Lindarin	41.0**	36.9	42.8						
*Harosoy	42.5	39.2	40.3	37.1	38.2	40.1	29.9		
*Hawkeye	39.3	36.8	39.2	36.5	34.2	35.4	27.0		
*Adams	39.9	40.6	41.6	38.6	34.0	35.5	29.6		
Ford	39.6	38.6	41.3	37.3	37.9	40.9			
*Lincoln	39.8	36.7	37.8	36.5	35.4	36.7	27.6		
*Shelby	39.2	39.8	40.6	40.7	39.6	43.9			
*Clark			42.0	43.6	41.0	46.2	30.0	34.6**	41.3**
Wabash					36.9	38.5	27.0	29.1	35.1
Dorman								33.9	38.5
Ogden								33.5	36.6
Lee								35.6	39.1

* These are the varieties recommended for Illinois.

** Only three years of data for this variety. The figure given has been adjusted to make it comparable with the other figures.

*** Only three years of data, 1956-58.

Following are the recommended varieties for Illinois:

CHIPPEWA is a very early variety, maturing here about the last of August. It is recommended for the northern two tiers of counties in the state. It is about 9 days earlier than Harosoy, stands better, and consistently outyields it. It is too early for maximum yields.

HAROSoy, a variety from Canada, matures eight days later than Chippewa. It is recommended for the northern half of Illinois, having consistently outyielded most other varieties in this section of the state. Because of its earliness and ability to produce high yields, it is also a good variety to choose to precede fall-planted grain in central Illinois.

LINDARIN will be on the recommended list for Illinois for the first time in 1959. It matures at the same time as Harosoy and resists lodging much better. It has

(Continued on other side)

not yielded quite so well in northern Illinois, but has done as well as or better than Harosoy in the central region. Compared with Hawkeye, it yields a little better and equals it in lodging resistance. It is a rather short variety but produces its pods well up from the ground. Lindarin has just been developed at the Purdue Agricultural Experiment Station in cooperation with the U. S. Department of Agriculture. Seed will not be available in quantity until at least 1960.

HAWKEYE, about three days later than Harosoy, is the leading variety in total acreage in this state. In 1958 it was grown on 32 percent of the acreage in soybeans in Illinois. It has large, usually high-quality seeds and excellent resistance to lodging and is a good variety for the northern half of the state.

ADAMS, three days later than Hawkeye, will generally outyield Hawkeye and in some cases Harosoy in the central half of the state, but its resistance to lodging is somewhat poorer than that of Hawkeye. In south-central Illinois it is planted extensively to precede winter wheat. In order to avoid green stems after it ripens, it should not be planted before May 15.

SHELBY, a new high-yielding soybean variety, has just been developed by research workers in the Illinois Agricultural Experiment Station and the U. S. Regional Soybean Laboratory. The new variety is similar to Clark in plant growth but is six days earlier in maturity. It is similar to Lincoln in maturity and about three days later than Adams. Since it outyielded both of these varieties and is equal to them in other respects, Shelby should replace all Lincoln acreage and some acreage of the slightly earlier variety, Adams. Shelby is adapted to the central and south-central part of Illinois as a full-season variety. In the south-central and southern part of the state, it is outyielded by Clark but has the advantage of being six days earlier. Foundation seed stock of Shelby was increased in 1958 and will be distributed to registered seed growers in the spring of 1959.

LINCOLN is similar to Shelby in maturity and should be replaced by the higher yielding Shelby as soon as the seed becomes available.

CLARK is taking over most of the soybean acreage in southern Illinois. It has outyielded most other varieties, whether earlier or later, in southern Illinois tests. It resembles Lincoln, but is six days later, more resistant to lodging, and higher yielding. It can be grown as far north as Champaign County, but to produce high yields this far north it must be planted early.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 2, 1959

PUBLICATIONS OF UNIVERSITY OF ILLINOIS
AGRONOMY DEPARTMENT

No. 96

The following list contains some of the most popular Agronomy Department publications of the past few years and also some more recent releases with which you may not be familiar. We present them as a guide to you in obtaining up-to-date information from your Agronomy Department. Order by number (B - bulletin; C - circular; AG - mimeograph; SR - soil report) and/or title.

Corn

- B635 Performance of Commercial Corn Hybrids in Illinois, 1958. 46 p.
- B636 1958 Performance of Experimental Corn Hybrids in Illinois. 46 p.
- AG1645 Recipe for 100-Bushel Corn
- AG1707 Effects of Planting Rate and Light Intensity on Corn Yields
- AG1709 Establishing Legumes in Corn
- AG1718 Breeding Corn Adapted for High Planting Rates
- AG1777 Nitrogen for Corn

Small Grains and Oil Crops

- B556 Soil-Borne Wheat Mosaic. 35 p.
- C726 Crops for Emergency Plantings. 8 p.
- C774 Grain Sorghums in Illinois. 16 p.
- C782 Winter Barley: A Feed Insurance Crop for Southern Illinois. 6 p.
- C784 Winter Oats for Southern Illinois. 16 p.
- C788 Spring Oats for Illinois. 24 p.
- AG1639 Oat and Wheat Seed Treatments
- AG1785 Grain Sorghum Variety Trial
- AG1806 Summary of 1958 Illinois Winter Wheat Variety Demonstrations
- AG1808 Summary of Illinois Spring Oat Variety Demonstrations, 1958
- AG1817 Illinois Oat Variety Trials, 1958

Legumes and Grasses

- B569 The Clark Soybean for Illinois. 4 p.
- B628 Reclaiming Illinois Strip Coal Land With Legumes and Grasses
- C559 Sweet Clover for Illinois. 24 p.
- C649 Better Farming With a Legume-Grass Program. 12 p.
- C650 Ladino Clover in Illinois. 11 p.
- C676 Soybean Diseases in Illinois. 32 p.
- C725 Growing Birdsfoot Trefoil in Illinois. 16 p.
- C727 Growing Red Clover in Illinois. 8 p.
- C740 Keeping Southern Illinois Pastures Productive. 12 p.
- C743 How to Make Good Grass-Legume Silage. 6 p.
- C756 Alfalfa. 19 p.
- C794 Soybean Varieties for Illinois. 11 p.
- AG1713 Effects of Frequency and Dates of Cutting on Dry-Matter Yields of Sudan-Grass Varieties
- AG1716 Effect of 5 Legumes and Grass Species on Performance of Pasture Mixtures
- AG1798 Forage Sorghum Variety Trials in Illinois
- AG1803 Improved Alfalfas for 1959
- AG1812 Alfalfa Trials in Illinois, 1958

Weed Control

- C718 Weeds of the North Central States. 239 p. (Charge)
- AG1778 Controlling Johnsongrass in Illinois
- AG1816 Pre-emergence Herbicides

Soils

- B539 Soil Building With Legumes. 16 p. Describes results from Illinois soil experiment field.
- B577 Yield and Composition of Corn Forage as Influenced by Soil Fertilization. 20 p.
- C575 How to Farm on the Contour. 6 p.
- C593 Grass or Gullies. 20 p. Tells how to build and maintain grass waterways.
- C604 Shall We Fall-Plow or Spring-Plow in Northern Illinois? 8 p.
- C663 Handling Northeastern Illinois Soils. 16 p.
- C667 Protecting Your Soil. 24 p. A brief guide to sound conservation practices.
- C721 Limestone--How to Use It, When to Use It, Where to Use It. 12 p.
- C734 Plain Talk About Soil Management. 16 p.

(Continued)

Soils (Cont.)

- C758 Understanding Soils. 40 p.
C765 Potassium - When to Use It, Where to Use It, How to Use It. 12 p.
C777 The Morrow Plots. 18 p.
C787 Watch Your Soil Tilth. 8 p.
SR77 Henderson County Soils. 64 p.
SR78 Lawrence County Soils. 92 p.
AG1562 What's in the Fertilizer Bag?
AG1571 Nitrogen Fertilizers - What They Are and How They Act
AG1578 Effect of Cropping Systems on Corn Yields and on Physical Properties of Some Dark-Colored Soils
AG1588 Nitrogen Recommendations
AG1710 Northern Illinois Experiment Field
AG1731 Available Water-Holding Capacity of Some Illinois Soils
AG1732 Five Suggested Plans for Simple Fertility Demonstrations
AG1733 What the Soil Tests Tell You
AG1752 Rotations, Phosphates, Nitrogen, Agronomy Farm - Urbana
AG1776 Function of Organic Matter in Crop Production
AG1777 Nitrogen for Corn
AG1784 Illinois Soil Testing Data by Counties
AG1786-89 Fertilizer Demonstrations for Corn
AG1793 Brownstown Soil Experiment Field
AG1794 Fertilizers, Fertilizer Materials, and Rock Phosphate Sold in Illinois. 6-1-57 to 12-31-57
AG1795 Raleigh Soil Experiment Field With a Summary of Results on Six Light-Colored Soils
AG1796 Enfield Soil Experiment Field With a Summary of Results on Six Light-Colored Soils
AG1797 Ewing Soil Experiment Field With a Summary of Results on Six Light-Colored Soils
AG1799 Mt. Morris Soil Experiment Field With a Summary of Results on 12 Dark-Colored Soils
AG1801 Soil Survey Publications
AG1802 Soil Testing Summary
AG1804 Guide to Elwood
AG1807 Fall Application of Nitrogen
AG1809 Fertilizers, Fertilizer Materials, and Rock Phosphate Sold in Illinois. 1-1-58 to 6-30-58
AG1810 Questions and Answers on Minimum Tillage
AG1813 Fertilizer for Corn--Bulk or Band?
AG1818 Using Soil Maps for Equitable Appraisal and Tax Assessment of Rural Land

General

- Agronomy News. Timely releases of current agronomic research results
Agronomy Facts, Vol. 1, Vol. 2, Vol. 3, Vol. 4, and Vol. 5 (Charge) Compilation of brief articles on pertinent agronomic topics
AG1737 Graduate Study in Agronomy. Brochure for prospective students
AG1814 Historical Record of Crop Yields in Illinois

For topics not covered here or for more specific information, write to the University of Illinois College of Agriculture, Urbana, Illinois. Also watch the Agronomy News for the latest publications of your Agronomy Department and, if possible, tune in to WILL, the University of Illinois Station, for agronomy topics to be heard Monday of each week from 12:15 to 1:00 p.m. on the Illinois Farm Hour.

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AGRONOMY

CROPS AND SOILS

NEWS

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February 9, 1959

No. 97

ORCHARDGRASS, ITS USE IN ILLINOIS

Orchardgrass is a long-lived perennial bunch-type grass that has proved to be a good companion of legumes and an excellent component of pasture mixtures. Experiment stations in the North-Central States are now aware of its possibilities and are conducting extensive studies on use, management, and improvement. Results have shown many features that place orchardgrass among the best grasses now available.

Climatic Adaptation: Orchardgrass is not so winter-hardy as Kentucky bluegrass, smooth brome, or timothy, but it is considered to be more tolerant to heat than these other grasses. It starts its growth earlier in the spring than either brome grass or timothy and frequently heads by the first week of May in central and southern Illinois and by the middle of May in the northern counties. Orchardgrass grows well into the fall, remaining productive and green until freezing weather. Its ability to grow during the drier, warmer part of the summer and its rapid recovery after grazing or mowing result in favorable distribution of the aftermath. Its vigorous growth helps to maintain a good grass-legume balance--important in the control of pasture bloat.

Soil Requirements: Orchardgrass is similar in soil requirements to timothy and smooth brome grass. It responds well to high levels of soil fertility and particularly to adequate supplies of nitrogen.

Palatability: The rapid, early growth and early heading of orchardgrass account for the low palatability rating often given to this grass. When it is allowed to set seed, it becomes coarse and stemmy, semidormant, and low in feeding value for the rest of the season. Forage of satisfactory palatability and feeding value can be produced by removing the seed heads soon after they emerge and by keeping the plants in good grazing condition during the rest of the season. The most common errors in the management of orchardgrass-legume combinations is delaying grazing until too late in the spring and using too few animals to remove the herbage before maturity.

Planting: It is usually best to seed orchardgrass in the early spring before the last frosts have occurred. Early seeding enables the seedlings to become established ahead of many annual weeds and before the dry, hot periods of the summer. Late summer and early fall seedings are satisfactory in southern Illinois in seasons when moisture is favorable. With too heavy a seeding, the aggressiveness of orchardgrass will tend to crowd out a companion legume, particularly Ladino clover. For best results, seedbeds should be well prepared and firm. Even distribution and shallow coverage of seed are important: Seeding should be followed by packing. The following seeding rates and mixtures are suggested:

	Seeding rates (lb./A.)	
	Legume	Orchardgrass
Ladino clover	3/4 - 1	3 - 5
Alfalfa	6 - 8	3 - 5
Red clover	6 - 8	3 - 5
Birdsfoot trefoil	4 - 6	2 - 3

More than one legume and one grass can be used in a given mixture, with the seeding rate of individual species adjusted accordingly. In experiments at Urbana, orchardgrass has been superior in mixtures with legumes.

Mixtures of orchardgrass and brome (with a legume) do very well. On sloping land it is desirable to include brome because it is sod-forming and better than orchardgrass for holding soil against erosion. A mixture of 6 pounds of alfalfa, 4 pounds of brome grass, and 3 pounds of orchardgrass is desirable.

Uses: Even though orchardgrass is primarily a pasture grass, it is satisfactory for hay and silage if properly managed. It should be harvested in the early head stage, especially when used for hay. In orchardgrass-alfalfa combinations, the alfalfa is not ready for harvest at the same time as the first crop of orchardgrass. However, the time of the first cutting should be based on the maturity of the orchardgrass, and subsequent cuttings should be conservative to insure maintenance of the alfalfa stand.

Varieties: Many varieties and strains of orchardgrasses have been developed and tested, but only two varieties, Common (or Commercial) and Potomac, are recommended in Illinois. Seed of Common that is produced in the mid-Atlantic states or the southern corn belt is good in all-round performance and is winter-hardy. Seed of Common of unknown origin or from places like Australia and New Zealand should not be used in northern Illinois because it may not be sufficiently winter-hardy. Potomac is a relatively new variety of orchardgrass that was developed at Beltsville, Maryland. Potomac matures about three days later than Common, is winter-hardy, is somewhat leafier, and the leaves maintain their green color better with approaching maturity than do the leaves of most Common seedlots. It is much more resistant to leaf rusts than Common but is somewhat more susceptible to other leaf diseases occurring in Illinois. In Illinois trials conducted since 1955, yields of Potomac and Common have been the same. Certified field seed of Potomac was produced on 460 acres in Oregon and Washington this past season, and there is an estimated 150,000 pounds of seed. Thus Potomac can be recommended extensively in 1959 for use in forage seed mixtures. Certified Potomac seed can be obtained through commercial channels.

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AGRONOMY

CROPS AND SOILS

NEWS

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February 16, 1959

No. 98

ILLINOIS SPRING OATS

In Illinois, oats produced an average yield of 55 bushels an acre in 1958. This yield was 13 bushels more than average and only one bushel short of the record high in 1955. A favorable growing season with little disease damage was largely responsible for this good record.

The four leading oat varieties and the percent of acreage of each in Illinois in 1958 were as follows: Clintland, 36; Nemaha, 25; Newton, 16; and Clinton, 7. Clinton dropped 28 percentage points below its 1957 yield. A severe attack of leaf rust in 1957 was chiefly responsible. Most of the Clinton acreage was replaced by the stiff-strawed rust-resistant varieties Clintland and Newton, which increased from 18 and 3 percent in 1957 to 36 and 16 percent, respectively, in 1958. Minhafer, a relatively new high-yielding rust-resistant variety from Minnesota that was certified for the first time in 1958, will probably increase in acreage in 1959.

Oat variety tests were grown in small replicated plots at several locations in Illinois in 1958. Three of these locations were Urbana, Champaign County; Hartsburg, Logan County; and Shabbona, DeKalb County. In addition to these small plot tests, varieties were grown in replicated combine plots of about 1/50 acre each at Brownstown, Fayette County; and Urbana, Champaign County. All tests were planted at the rate of three bushels an acre.

The following table summarizes yields at four of the test locations. Three-year averages are given for varieties that have been tested for that length of time.

Oat Variety Test Yields (Bushels per Acre)

Variety	Shabbona		Hartsburg		Urbana				Brownstown ^{1/}
	DeKalb Co.		Logan Co.		East-Central Ill.		Small		Fayette Co.
	N. Ill.		Central Ill.		Combine		plots		S. Central Ill.
	3 yr.		3 yr.		3 yr.		3 yr.		Combine plots
	1958	av.	1958	av.	1958	av.	1958	av.	1958
Early									
Andrew	101	93	61	58	93	64	107	95	72
Fayette	81	84	61	48	75	59	88	87	60
Minhafer	109	104	70	61	92	--	108	101	68
Mo. O-205	102	90	72	64	97	60	112	94	69
Nemaha	92	84	58	51	89	58	95	85	72
Putnam	97	86	65	48	86	55	104	85	64
Shield	121	--	72	--	108	--	108	--	--

(Continued)

Mid-Season

Beedee	101	101	65	61	90	65	96	87	57
Burnett	100	98	74	63	96	66	110	95	59
Clarion	100	88	71	61	90	59	105	90	78
Clintland	115	106	68	58	96	66	105	96	77
Clinton	92	78	66	54	84	52	102	81	65
Logan	100	91	63	60	94	60	100	91	71
Newton	102	99	64	57	94	65	101	88	84
Waubay	99	90	73	58	99	64	98	85	73

Late

Garry	114	107	90	64	100	63	102	87	--
Sauk	103	100	72	58	96	66	107	97	--
Simcoe	106	98	88	63	74	--	109	93	--

1/ Late plantings at Brownstown were not worth harvesting for yield in 1957; thus it was not possible to obtain a three-year average for that location.

Results of research and past experiences have made it possible to draw some valuable conclusions about spring oats:

The spring oat crop should be seeded as soon as the soil can be worked in the spring. Research shows that in average seasons spring oats will do well in northern Illinois when seeded any time from the last half of March to the middle of April. In central and southern Illinois, however, they should be seeded before the first of April if possible. Do not be afraid of sowing oats too early; hard freezes have been known to kill some plants, but the remaining ones will still yield more than later seeded oats.

It is always best to plant certified seed; but if that is not possible, use good-quality seed oats. Many oats were harvested with a high moisture content in 1958 and may not grow when seeded after storage. Be sure of getting a high germination rate by running a germination test before using the seed. Then clean and treat the seed with Ceresan M or Panogen according to the manufacturer's direction.

Seed with a drill if possible. A drill puts the seed into the ground at a uniform depth and allows the plants to establish good root systems. In tests at the Illinois Agricultural Experiment Station, drilled oats outyielded broadcast oats by 5 to 10 bushels an acre. Seed drilled oats at the rate of 8 pecks to the acre; seed broadcast oats at the rate of 10 to 12 pecks an acre.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 23, 1959

No. 99

INDEX TO AGRONOMY NEWS NOS. 1 - 99

This issue of Agronomy News is an index to all previous issues. It will serve as a convenient guide for making your personal set of Agronomy News a useful and handy reference.

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Please note this correction in the preceding issue, No. 98, "Illinois Spring Oats": In the second paragraph, part of the third line should read "1957 acreage" rather than "1957 yield."

Attend the 1959 Farm and Home Festival April 2, 3, and 4 and see "Research for Tomorrow."

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URBANA

March 2, 1959

No. 100

THE MORROW PLOTS

Back in February 1956, Agronomy News published its first issue. This is issue number 100. In this centennial issue, we would like to pay tribute to George E. Morrow and Manley Miles, the men who established the Morrow Plots at the University of Illinois in Urbana.

Illinois can point with pride to the Morrow Plots, which were laid out in 1876 and are the oldest experimental plots in America. We believe the continuous corn plot is the oldest in the world.

These plots, located in the center of the campus, demonstrate three very important soil management practices: soil depletion, soil maintenance, and soil improvement.

Since 1903, there have been three sets of plots:

1. The two north plots have grown corn continuously since 1876.
2. The two middle plots have been cropped in a corn-oats rotation. Catch crops have been seeded in the oats on one of these plots and plowed down the following spring for corn.
3. The two plots at the south end have been in a corn-oats-red clover rotation.

The south plot in each of the three systems has received manure, limestone, and phosphorus treatments.

The following table compares corn yields on the different plots during the fifty years ending in 1955.

Table 1. Average Corn Yields (Bushels per Acre)
1904-1919 and 1938-1955

Fertilizer treatments	Rotation					
	Continuous corn		Corn-oats		Corn-oats-clover	
	1904-1919	1938-1955*	1904-1919	1938-1955*	1904-1919	1938-1955*
No treatment	26	23	40	34	51	62
Manure-lime-phosphorus (MLP)	40	61	62	94	68	100

*Hybrid corn was introduced on the plots in 1937 and replaced open-pollinated corn completely in 1943.

The year 1955 began an important new chapter in the history of the Morrow Plots. The north plot had grown corn continuously for 80 years without soil treatment, and soil tilth was poor. New questions were raised. Had the soil been permanently

(Continued on other side)

damaged? Could it be revived with new treatment? Had the best plots reached maximum productivity? To answer these questions, one-fourth of each plot received additional soil treatment.

Limestone was applied to previously unlimed plots at the rate of five tons an acre. Nitrogen in the form of urea was added along with superphosphate and muriate of potash. In 1956 additional soil treatments were applied. In just two years, heavy fertilizer treatments on this part of the continuous corn plot boosted the yield from 29 to 113 bushels an acre.

Last year's results emphasize the importance of fertilization:

Table 2. 1958 Corn Yields (Bushels per Acre)

Fertilizer treatments		Rotation		
1904-1955	1955-1958	Continuous corn	Corn-oats	Corn-oats-clover
None	None	32	(No corn yields,	63
	LNPK (new)	130	since 1958 was	146
MLP	ML	84	the oat year in	140
	LNKP (new)	139	this rotation)	144

L = Lime; N = Nitrogen; P = Phosphorus; K = Potassium; M = Manure.
(New) = New treatment started in 1955 on the old plots.

Thanks to the foresight of George E. Morrow and Manley Miles, who started these long-range experiments, we have a concrete way of showing the importance of proper soil management. To farmers with worn-out prairie soils, the results should offer some new hope. However, we should point out that there has been little erosion to affect the deep topsoil of the Morrow Plots, which also have a permeable subsoil.

Careful judgment must be used in applying the results of the Morrow Plots to soils that do not have similar physical characteristics.

The lessons we learn from the Morrow Plots not only give hope of bringing depleted land back into profitable production, but also issue a warning of what can happen to land that is not properly managed.

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CROPS AND SOILS

NEWS

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March 9, 1959

No. 101

THE DRILL BOX SURVEY OF SPRING OATS

A spring oat drill box survey was conducted in the spring of 1958. It was a joint effort between the farm advisers of Illinois, the Illinois Crop Improvement Association, and the Department of Agronomy. The purpose was to survey or sample the oats being used for seed by farmers in Illinois. Representative samples for this survey were collected from 1,496 farmers in 60 northern Illinois counties. We were interested in getting the answers to these four questions:

1. Where had the farmer obtained the oats he was using for seed?
2. What was the quality of seed being planted by Illinois farmers?
3. What had farmers done to prepare the seed for planting?
4. What did the farmer know about the seed he was planting?

The survey was conducted in this way: The farm adviser or someone working with him went out in the field at oat-planting time and picked up samples of the seed that was actually going into the ground. At the same time he filled out a questionnaire with the farmer's help. The Illinois Crop Improvement Association made germination and purity tests on each sample. The Department of Agronomy summarized the results from these tests and information in the questionnaire. This summary will be published in the near future. Although the summary involves much more information than we can put in the Agronomy News, we will briefly mention some items of interest.

Source of Seed - Fifty percent of the farmers were using oats out of their own bins for seed, 28 percent went across the fence and obtained oats from their neighbors, 17 percent bought seed from a seedsman, and 5 percent obtained seed from some other source (in most cases an elevator). Ten percent of the seed planted by these Illinois farmers was certified seed.

Quality of Seed - In general, the quality of spring oats used for seed in 1958 was good. However, 3 percent of the samples germinated below 80 percent, and some contained excessive amounts of weed seed. For instance, one sample contained over 1,500 foxtail seeds per pound of oat seed. Another sample contained 132 Canada thistle seeds per pound of oat seed. Many other examples of excessive weed seed could be listed.

Preparation of Seed - Seventy-one percent of the oats planted in this survey had been cleaned, and 39 percent had been treated.

What Was Known About the Seed Before Planting - Fifty-nine percent of the farmers had had germination tests of some kind, but only 26 percent had had purity analyses.

Conclusions - When quality is correlated with source, preparation, and knowledge of seed before planting, we find the following:

1. In most cases the samples that were low in germination or that contained excessive weed seed were from a farmer's own bin or from his neighbor's bin.
2. In every case of low germination, no germination test had been run before the seed was planted.
3. In 9 out of 10 cases of excessive weed seed, no purity analysis had been run on the seed before planting. In other words, several farmers did not know what they were planting, and the seed in many cases was stark evidence of that fact.
4. In most cases the samples that contained excessive weed seed had not been cleaned. However, in some cases the farmer reported having used cleaned seed, but the samples were still found to contain an excessive amount of weed seed. It is a well known fact that cleaning is both an art and a science. In many cases it takes more than one type of equipment to properly clean seed.

The State Department of Agriculture will make five germination and purity tests a year for any Illinois farmer. If you have not already obtained a germination or purity analysis on the seed you expect to plant this spring, you can obtain this information by sending a sample to the Superintendent of Plant Industry, State Fairgrounds, Springfield, Illinois. Send about 1 pound of seed and allow at least two weeks for a reply. It takes 10 days for a germination test, and at this time of the year the State Seed Laboratory will be very busy.

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CROPS AND SOILS

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March 16, 1959

No. 102

TESTING ILLINOIS SOILS

A balanced and permanent soil fertility program for Illinois farms must provide for plant food balance, good soil tilth, and favorable conditions for soil organisms and for control of erosion. Proper plant food balance is the main foundation on which to build a good soil fertility program. For this reason probably no information can be of more practical value to the farmer than tests of his soil for lime, phosphorus, and potassium. These tests will make money for him by showing what treatments he needs to apply to his soil in order to produce top yields. They may also save him money by showing him where his soil does not need treatment.

The first step in getting soil tests is to do a good job of taking soil samples from the fields. The tests can be no better than the way in which the samples are collected. Complete directions for collecting soil samples can be obtained from county farm advisers, vocational agriculture instructors, commercial testing laboratories, and the University of Illinois Department of Agronomy. Early spring or late fall is usually a poor time to collect soil samples. Wet soil samples are difficult to crush and screen, and it will be necessary to wait longer to get the report of the tests. Under good conditions it usually takes from two to three weeks to test the soil and get the report back to the farmer. The soil must air-dry for ten days before the potassium test can be run.

There are a number of places where soil samples can be sent for testing purposes. There are 80 county extension soil-testing laboratories, 42 commercial laboratories, and two soil-testing laboratories here at the University. The Department of Agronomy maintains a laboratory for the purpose of checking farm soil samples for the county and commercial laboratories. For tests on soil from lawns, gardens, or greenhouses, samples should be sent to Soil-Testing Laboratory, Floriculture Building, University of Illinois, Urbana, Illinois.

As a result of Illinois' well-developed soil-testing services, it was possible for Illinois farmers to have 662,000 samples tested in 1957. This was the largest number of soil samples tested in any state. Wisconsin ranked second with 175,000 samples. Even with this impressive record, the soils on many Illinois farms still need testing, and most soils need retesting every five or six years.

The recommendations sheet that the farmer receives after his soil samples are tested is concerned mainly with lime, phosphorus, and potash. The fertilizer recommendations will not take into account the previous soil treatment history unless this information is supplied with the soil samples. The testing laboratory needs to know the amounts of lime, phosphorus, and potash that have been used in the past in order to make the best recommendations to the farmer. The reason is that test results on land that has not previously been treated may mean something altogether different from the same results on a soil that has already been treated. Remember, the tests will be of no value to you unless you understand them and follow the recommendations.

A NEW APPROACH TO LEGUME INOCULATION

During the past few weeks, a number of people have written for information about a new inoculation procedure that is receiving publicity in farm papers and magazines. The process is called "Noculization" and has been developed by Northrup, King & Co. The idea is to inoculate the legume seed with the proper nitrogen-fixing bacteria before it is sold to the farmer. The process involves buffing the seed and then wetting it with a solution containing the bacteria. The seed is then placed in a vacuum. The vacuum is released, and the bacteria remain tightly bound by the seed. After drying, the seed is ready for distribution. Tests made by Northrup, King & Co. indicate that "Noculized" seeds still perform well after being stored for several months. The bacteria apparently remain on or in the seed coat in an inactive or dormant condition during storage.

The possible convenience and saving of time that this process could provide has encouraged many farmers to ask your Agronomy Department for information on "Noculized" seed. A preliminary test of seed "Noculized" by Northrup, King & Co. in October 1958 was started by the Agronomy Department in November of the same year. The results of this test were favorable with respect to nodule formation and crop growth. Further tests on storage of "Noculized" seed are now in progress.

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CROPS AND SOILS

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March 23, 1959

No. 103

MINIMUM TILLAGE FOR CORN AND SOYBEANS

More and more farmers are trying minimum tillage each year. They are finding that the practice reduces both labor and production costs. But the results obtained by many farmers are bringing questions from others who are debating whether to try the practice on their own farms.

The more popular methods of minimum tillage are:

1. Plow planting. Plowing and planting in one operation at the time the crop is normally planted.
2. Wheel-track planting. A separate operation after plowing in which the seed is carefully planted in a strip compacted by a tractor wheel or other weighted wheel ahead of the planter shoe.
3. Modifications. Pulling behind the plow some sort of smoothing implement (plow packer mulcher, "Ez-ee" tiller--now Valley tiller--spike harrow, or reverse rotary hoe) before planting.

The following table shows how yields from these minimum-tillage methods compare with those from conventional tillage. These were replicated trials in experiment fields. For conventional planting the field was plowed, disked twice, harrowed, and planted. For wheel-track planting an automobile tire was mounted ahead of the planter shoe.

Method	Average yields, 1957-58			
	Brownstown	Urbana	DeKalb	Average
Corn, bu. per A.				
1. Conventional	95.7	122.3	106.7	108.2
2. Plow, plant	92.7	188.8	105.4	105.6
3. Plow, spike-tooth, plant	95.2	121.8	108.3	108.4
4. Plow, wheel-track plant	92.1	120.6	101.6	104.8
Soybeans, bu. per A.				
1. Conventional	29.7	38.8	31.2	33.2
2. Plow, plant	31.7	42.2	32.0	35.3
3. Plow, spike-tooth, plant	30.7	41.3	33.5	35.2
4. Plow, wheel-track plant	32.5	41.3	31.5	35.3

Minimum tillage has several advantages:

1. Production costs are reduced. Each trip over a field that can be eliminated saves about a dollar an acre in cost.
2. Weed control is improved. Any seedbed preparation method that leaves the soil between the rows rough and uneven will reduce weed growth.

3. Soil erosion is reduced. A rough seedbed soaks up more rain water and leaves less to run off the surface and carry away valuable topsoil.
4. Soil compaction is reduced. Fewer trips over the field during a cropping season mean less soil compaction and more favorable conditions for root growth.

Minimum tillage also has some limitations:

1. A good job of plowing is essential to pulverize the soil and cover all trash. Weeds and growing forages must be completely turned under to prevent their growth.
2. The soil must be in good tilth, and a good seedbed must be prepared in the immediate vicinity of the seed. This may be difficult to do on heavy, sticky, or drouthy soils.

Minimum tillage trials were conducted in Christian County in 1958. In these trials corn was planted by the plow-plant method (a once-over operation). The results have led workers at the Illinois Experiment Station to believe that minimum tillage offers greater possibilities for improving soil tilth and is more workable on heavy-textured soils than on the extensive areas of silt loam in Illinois. The "gumbo" soils require improved aeration in order to produce to maximum capacity, and aeration can be improved by minimizing the number of trips over the field. Several farmers who have tried minimum tillage in northeastern Illinois report that their soils were easier to plow the second and third years.

Farmers who are interested in trying minimum tillage should see their farm advisers or write to the Department of Agronomy, University of Illinois, Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 27, 1959

No. 104

PLANTING CORN IN ILLINOIS

Corn is usually planted by one of three methods in Illinois: It is hill-dropped (power-dropped), check rowed, or drilled. When weeds are kept under control, method of planting makes very little difference in yield. Drilling has been known to show a small yield advantage, but on the other hand more lodging usually occurs with this method. Regardless of which method is used, the normal planting rate for corn in Illinois is usually 12,000 to 16,000 plants per acre. The best rate for any specific farm depends on the soil type, the fertility level, and the outlook for an adequate water supply during the growing season.

It has often been shown that corn tends to have poorer standability and lower yields as rate of planting is increased above the optimum. But some new trends have recently shown up in corn experiments in Illinois. A few hybrids ("high-density" or "high-rate" hybrids) have been found that are able to withstand the usually damaging effects of planting too thickly and that manage to produce either satisfactory or superior yields. From tests conducted at the University of Illinois, statistics show that heredity unquestionably accounts for the ability of certain hybrids to yield well even at populations above the optimum for the environment in which they were grown. A single-cross hybrid (Hy2 x 07) has been outstanding for its ability to yield well at high planting rates. This hybrid was crossed with other hybrids, and the resulting double crosses were tested for their performance at high populations. Some of the results obtained in 1957 and 1958 are presented in the following table:

Performance of High-Density Hybrids at Two Planting Rates,
Agronomy South Farm, Urbana*

High-density hybrid		Bu./A.		% erect plants	
		**16,000	24,000	16,000	24,000
***A101	1957	110	127	80	17
	1958	121	144	86	48
	2-yr. av.	116	136	83	32
***A102	1957	118	133	70	20
	1958	125	149	79	55
	2-yr. av.	122	141	80	38
Ill. 1996	1957	106	123	86	48
	1958	117	166	95	81
	2-yr. av.	112	145	91	65

* Data at different planting rates within years are not strictly comparable because hybrids were planted in different fields.

** Data taken from Bul. 623 and 636.

*** Experimental designations.

According to the data accumulated by your Agronomy Department, it appears that:

1. The experimental high-rate hybrids perform as well as conventional hybrids at the rate of 16,000 plants per acre. They perform considerably better when both are planted at 24,000 plants per acre.
2. High-rate hybrids probably are "farmer hybrids"; that is, they may safely be planted at high rates without fear that adverse weather will penalize yields. If conditions are ideal, highest yields are likely to be produced with high planting rates. If conditions are unfavorable, high-rate hybrids can be expected to yield as well as conventional hybrids planted at optimum rates.
3. With present corn-harvesting methods, the reduction in standability at high populations is likely to discourage high-rate planting. If, in the future, however, corn is combined or harvested with picker-shellers early in the season (30 percent moisture) and dried artificially, standability will be less important than it is now. Then it can be expected that hybrids similar to the high-rate hybrids now being tested will come into general use.

Please note this correction in the preceding issue, No. 103, "Minimum Tillage for Corn and Soybeans": The corn yield given in the table for "Plow, plant" at Urbana should be "118.8" rather than "188.8."

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CROPS AND SOILS

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URBANA

March 30, 1959

No. 105

JOHNSONGRASS AND ITS CONTROL IN ILLINOIS

Johnsongrass is a perennial sorghum that closely resembles Sudangrass in appearance. It was brought to this country from the Mediterranean area by an unidentified farmer around 1830. Several years later Colonel William Johnson grew this grass in Alabama in search of a superior forage plant, and Johnsongrass has been used as its common name ever since. Today Johnsongrass is regarded as a perennial weed that can seriously reduce crop yields. It has become common throughout most of the south and has been reported to occur as far north as Michigan.

Many acres of rich bottomland in southern Illinois have been abandoned because of solid stands of established Johnsongrass. It is known to occur in river bottoms as far north as Danville on the eastern side of the state and Quincy on the western side. In upland regions, it is most likely to be found first as isolated clumps or small patches. If not controlled, such infestations could become serious in these areas also. Johnsongrass spreads rapidly in two ways--by seed and by underground rootstalks called rhizomes. For this reason a program had to be developed that would control the old established grass and also prevent reestablishment of new stands from seed. The control program outlined here is based on results of three years of field testing in the Alexander-Pulaski County area in addition to work done at Urbana.

Controlling Established Johnsongrass. Johnsongrass can best be controlled mechanically by plowing and then disking frequently after the harvesting of a winter grain, such as wheat. Disking at two- or three-week intervals until fall reduces the food supply stored in the rhizomes and also prevents the production of seed. Many farmers, however, object to the need to repeat this practice for two or three years and would prefer to use an effective chemical control method.

For chemical control of Johnsongrass after small grain, the infested stubble should first be clipped or preferably chopped. When the grass regains a height of 12 to 18 inches, spray with Dowpon at the rate of 8 pounds in 30 to 40 gallons of water per acre. Then allow three weeks before plowing. Plant the area to corn or soybeans the following spring and, if possible, cultivate frequently enough to prevent the establishment of new grass coming from seed. This chemical method has given better results than tillage after small grain and apparently costs no more.

It is also possible to use Dowpon as a preplanting treatment in the spring if you do not wish to grow a winter grain crop. For this approach, omit spring tillage and let the Johnsongrass grow about a foot tall. Then spray at the rate of 10 pounds per acre. Plow the area after a week or 10 days, and then plant corn or soybeans in another 2 1/2 or 3 weeks. This waiting period after plow-down is necessary to allow the Dowpon to decompose. If you plant soybeans, allow the full three weeks to avoid crop injury.

(Continued)

Dowpon can also be used to spot-treat scattered clumps and small patches in growing crops. For this purpose a mixture of one pound in 6 gallons of water can be conveniently applied with a knapsack sprayer. It is also important to control Johnsongrass in non-cropped areas, such as fencerows, to eliminate this source of reinfestation. Dowpon at the rate of 10 pounds per acre is highly effective. Atlacide and sodium chlorate have been used in the past to control Johnsongrass in non-cropped areas and for spot treatment in growing crops. But because they present some fire hazard and cost more, Dowpon is beginning to replace them.

Controlling Johnsongrass From Seed. Johnsongrass can produce a crop of seed in about 70 days after it emerges. It is therefore essential to prevent the establishment of seedlings after the old grass has been killed. A new pre-emergence chemical for corn called Eptam (EPTC) has been tested for the past two years and found to be very effective in controlling the grass sprouting from seed. It was used at the broadcast rate of 3 pounds (actual) in 20 to 30 gallons of water per acre. (Cost is reduced about one-third by treating a 13-inch band with one pound (actual) in 7 to 10 gallons of water per acre and controlling the grass in the middles by cultivation.) To get maximum effectiveness with Eptam, it should be stirred into the soil soon after application with spike-tooth harrow, rotary hoe, or disk. Eptam is now available as dry granules as well as in liquid form. The granular form will be tested and compared with the conventional spray in field trials this season.

Controlling Solid Stands of Johnsongrass. Where Johnsongrass occurs as solid stands in cultivated fields, exceptionally good control has been obtained with Dowpon and Eptam. Best results in killing the underground roots has been obtained with the 8-pound rate of Dowpon applied during the summer or early fall. Spring treatment before planting corn, however, has been nearly as good. After the Dowpon treatment, Eptam should be used as a pre-emergence incorporated treatment to control Johnsongrass seedlings. But do not use Eptam on soybeans.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 6, 1959

No. 106

GIANT FOXTAIL VS. CORN AND SOYBEANS

Giant foxtail (alias "wild millet") will again compete with corn and soybeans this summer in an event that takes place annually in Illinois fields. Several years ago most of the "enthusiastic" competition was in central Illinois. Now the event has become more "popular" and is being held annually in other areas of the state as well.

To allow full-season corn hybrids and soybean varieties to do their best, farmers usually plant as early as possible. But this early start also makes it possible for giant foxtail to compete strongly with corn and soybeans for plant nutrients, water, space, and light. How concerned should we be about sharing some of these growth essentials with invading weeds like giant foxtail? To help answer this and similar questions, your Agronomy Department began a three-year project in 1957 to study the effects of foxtail on corn and soybean yields.

To make the results of this field research as realistic as possible, the middles in the corn and soybean plots were kept clean by ordinary cultivation. But, as often occurs in farmers' fields, a three- to four-inch strip of foxtail was left growing in the rows. It was thinned to various degrees by hand so that the remaining amount ranged from none in the check rows to as much as 70 (1957) and 28 (1958) foxtail plants per running foot of row where no thinning was done. These tests were conducted on a good silt loam soil known to have a natural infestation of giant foxtail. The results of two years of testing are given in the table below. Corn yields were converted to 15.5 percent moisture, and soybean yields to 12 percent moisture.

Foxtail stand	Corn yield, bu./A.			Soybean yield, bu./A.		
	1957	1958	2-yr. av.	1957	1958	2-yr. av.
Check - no foxtail	100.0	82.8	91.4	43.1	37.1	40.1
1 plant every 24 inches	98.1	75.5	86.8	42.3	33.5	37.9
1 plant every 12 inches	95.0	74.3	84.6	41.6	33.1	37.4
1 plant every 4 inches	93.5	72.8	83.2	40.4	32.4	36.4
1 plant every 2 inches	89.5	72.5	81.0	39.5	28.9	34.2
1 plant every inch	86.6	65.3	76.0	35.9	26.5	31.2
Unthinned stand	74.3	62.2	68.2	26.0	26.4	26.2

The yield reductions strongly support the need for growing concern about the increasing problem with giant foxtail. We can readily see how profitable an additional investment of time, money, and effort could be if it provided for the successful control of this grass.

(Continued)

The only practical solution your Agronomy Department can now suggest, if you have a serious giant foxtail problem, is to use a pre-emergence herbicide. This chemical is applied at planting time, before the crops and weeds come up.

It is usually applied in a 12- to 14-inch band over the row with planter attachments. This is the reason for the name "band spraying" given to this technique. There are several pre-emergence chemicals now on the market that can control such annual grasses as giant foxtail. Most of them can also control broad-leaved annual weeds. The recommendations for using these herbicides in corn and soybeans will appear in the next issue of Agronomy News. The advantages and limitations involved in using the various pre-emergence chemicals will be discussed briefly. For now, we will merely point out that, if the major weed problem in a corn or soybean field is giant foxtail and other annual grasses, Radox is probably the best chemical we can recommend at this time.

After two years' experience with these tests, it seems obvious that we must make a special effort to do everything possible to eliminate competition from foxtail and similar weeds if we are to expect the most efficient production and highest yields of corn and soybeans.

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AGRONOMY

CROPS AND SOILS

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UNIVERSITY OF ILLINOIS

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No. 107

PRE-EMERGENCE WEED CONTROL IN CORN AND SOYBEANS

Ordinary mechanical methods plus the post-emergence use of 2,4-D usually provide good control of broad-leaved weeds in corn. On the other hand, grasses are resistant to post-emergence applications of 2,4-D and ordinary cultivation often fails to control them satisfactorily in the row. In soybeans, broad-leaved weeds, as well as grasses, can be a serious problem. Here the use of 2,4-D is restricted because of the susceptibility of the soybeans. Where annual grass and broad-leaved weeds have become serious, farmers are justified in looking to pre-emergence herbicides for help. These chemicals are applied to the soil before the crops or weeds come up.

The table below lists chemicals for use in controlling different weeds in corn and soybeans and suggested rates of application. The first year a farmer tries a pre-emergence chemical he would be wise to treat only a small portion of a field. He will then have a chance to see how the chemical will perform under his own conditions and also get some experience in applying it.

Weeds	Pre-emergence herbicides	Rate in 20-30 gal. water/acre ^{1/}
<u>Corn</u>		
Annual grasses	Randox Simazine Eptam ^{2/} (incorporated)	1 gal. 4 to 6 lb. 2 qt.
Annual grasses and broad-leaved weeds	Simazine 2,4-D ester ^{2/} Eptam ^{2/} (incorporated)	4 to 6 lb. 1 1/2 lb. ^{3/} 2 2/3 qt.
Johnsongrass (from <u>seed</u>)	Eptam ^{2/} (incorporated)	2 qt.
Wild cane	Eptam ^{2/} (incorporated)	2 qt.
<u>Soybeans</u>		
Annual grasses	Randox Alanap ^{2/}	1 gal. 2 gal.
Annual grasses and broad-leaved weeds	Alanap ^{2/}	2 gal.

^{1/} Rates are for broadcast applications. Cost of materials (except 2,4-D) makes it most practical to apply in a banded strip centered over the row. For a 13-inch band, apply one-third the rate given here. For a copy of Circular 791, Band-Spraying Pre-emergence Herbicides, see your farm adviser or write the Illinois Agricultural Experiment Station, Urbana, Illinois.

^{2/} These materials sometimes cause crop injury. See discussion that follows.

^{3/} Actual amount of active ingredient (2,4-D acid). If applied as separate operation with the same type of sprayer used for post-emergence applications, 5 to 10 gallons of water per acre would be sufficient.

Randex is being widely recommended for the second year for the control of annual grasses in both corn and soybeans. For successful control, about half an inch of rain seems to be needed within a week or 10 days after treatment. Because Randex is irritating to the skin, rubber gloves and goggles should be worn if this chemical is used as a spray.

2,4-D ester (amine is too soluble) can be recommended for pre-emergence use in corn, although there is some possibility of a slight stand reduction. Injury rarely occurs, however, if the corn is planted three inches deep and if the soil is not sandy. If rain falls soon after treatment 2,4-D will do fairly well on grasses, but it usually does a better job on broad-leaved annuals.

Simazine can give full-season control of annual grass and broad-leaved weeds if rainfall occurs after treatment. However, until we know more about the residual effect, we suggest its use only on a limited basis, and preferably on corn that is to be followed by another crop of corn.

Eptam (or EPTC) has the unique ability to give excellent control of annual grass and broad-leaved weeds in corn without rainfall. Results of Illinois tests with this chemical allow us to fully recommend its use where Johnsongrass seedlings and wild cane are serious problems in corn. For general weed control in corn, it is recommended only on a trial basis until we learn more about this new herbicide.

Alanap is the only pre-emergence herbicide suggested for use when broad-leaved weeds (other than smartweeds) are serious in soybeans. Planting a good two inches deep and not treating soybeans on sandy soils decreases the possibility of crop injury.

Even though none of these chemicals is perfect, present information shows that they can all be expected to give satisfactory results most of the time. Contact your county farm adviser if you would like more details on a certain spray. The insurance that pre-emergence herbicides provide for early control of weeds is their greatest attribute.

Granular pre-emergence herbicides have been attracting a considerable amount of interest in recent months. Your Agronomy Department is planning field tests this year to see how they compare with sprays. If the results are favorable, the popularity of granular pre-emergence applications will undoubtedly increase.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 20, 1959

No. 108

AGRONOMY EVENTS

Experiment Field Meetings
1959 Spring and Summer Schedule*

<u>Date</u>	<u>Field</u>	<u>County</u>
May 12	Brownstown	Fayette
May 27	Raleigh	Saline
May 29	Enfield	White
June 9	West Salem	Edwards
June 10	Newton	Jasper
June 12	Carlinville	Macoupin
June 16	Minonk	Woodford
June 24	Urbana - Agronomy Day	Champaign
July 14	Dixon	Lee
July 15	DeKalb	DeKalb
August 31	Oblong	Crawford
September 2	Brownstown	Fayette
September 3	Newton	Jasper
September 3	Hartsburg	Logan
September 4	Toledo	Cumberland
September 4	Joliet & Elwood	Will
September 9	Oquawka	Henderson
September 10	Carthage	Hancock
September 11	Clayton	Adams
September 15	DeKalb	DeKalb
September 17	Kewanee	Henry
September 18	Aledo	Mercer
Fall date to be arranged	Carbondale	Jackson
" " " " "	Ewing	Franklin

*Watch your local paper for time of meeting.

Other Events

<u>Date</u>	<u>Event</u>	<u>Place</u>
May 16	State F.F.A. Awards Day Program	Urbana
June 2-4	Farm Advisers' Conference	Urbana
June 8-12	Grain Dealers' Bookkeeping School	Urbana
June 9-11	Illinois Vocational Agriculture Teachers Summer Conference	Urbana
June 13-19	National 4-H Club Conference	Washington, D. C.
June 16-18	State F.F.A. Convention	Springfield
June 23	State F.F.A. Judging Contests	Urbana
June 24	Annual Agronomy Day for Farmers	Urbana
June 30	Annual Meeting of Illinois Crop Improvement Association	Urbana

(Continued)

<u>Date</u>	<u>Event</u>	<u>Place</u>
July 1	Annual Field Day, Illinois Seed Dealers' Association and Illinois Crop Improvement Association	Urbana
July 14	State 4-H Judging Contest	Urbana
July 27	All-Industry Poultry Day	Urbana
August 14-23	Illinois State Fair	Springfield
August 26-27	State Sports Festival	Urbana
September 4	Cattle Feeders' Day	Urbana
September 16	Annual Field Day, Illinois Seed Producers Association	Urbana
October 13-16	Annual Extension Conference	Urbana
October 17-24	American Royal	Kansas City
October 30	Sheep Day	Urbana
November 16-19	I.A.A. Annual Meeting	Urbana
November 25-		
December 5	International Livestock and Dairy Show	Chicago
December 3	Farm Structures Day	Urbana

Agronomy Day

The third annual Agronomy Day will be held here at the Agronomy South Farm on June 24. A later issue of Agronomy News will contain details of the program. Mark the date of this event on your calendar now so that you can keep it in mind. Remember, this is your chance to see what your Agronomy Department is doing to help you get the most from your basic farm resources--your soils and your crops.

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Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

URBANA

April 27, 1959

No. 109

CROP INJURY FROM MISUSE OF 2,4-D AND SIMILAR HERBICIDES

2,4-D and closely related herbicides, such as 2,4,5-T and MCP, are the most popular weed and brush sprays used today. When used properly, they are valuable, economical, and very important tools that solve a wide variety of problems on farms, right-of-ways, and industrial properties. In the past few years there has unfortunately been increasing misuse of these sprays, and many cases of serious damage to sensitive crops have been reported. If this situation continues, there is talk that legislation may be introduced to restrict the use of 2,4-D, perhaps severely. Such action would be unfortunate, since it is now estimated that one-third of the corn acreage in Illinois is treated with post-emergence 2,4-D sprays.

Sources of Injury

There are two ways in which sensitive crops can be injured accidentally by weed sprays - through drift and volatility. Although often not regarded as such, drift is probably the main source of injury. It occurs when there is sufficient wind to carry fine spray mist over susceptible crops at the time of application. Volatility occurs when ordinary esters (such as isopropyl and butyl) are used. The vapors or fumes from the chemical rise up from treated foliage and move across susceptible crops. This may occur as much as three days after spraying.

Symptoms of Injury

Most broad-leaved plants that are exposed to 2,4-D soon react with typical symptoms on the leaves. These symptoms include drooping, puckering, thickened veins, and often dwarfed fan-shaped growth. In addition, the stems often become twisted and may have a blistered appearance. If the affected plants do not die, new growth frequently covers up the symptoms of previous injury on the older leaves. If there is a question about injury in an area, look for symptoms on sensitive plants like tomatoes and grapes. If these sensitive "indicator" plants do not show symptoms, then you can be sure the trouble is not 2,4-D damage.

Prevention of Injury

1. Never assume that it is safe to use any type of 2,4-D within half a mile of a susceptible crop unless there is sufficient wind to prevent the spray mist from drifting toward the crop. If the wind direction changes, stop spraying at once.
2. Never use high-volatile esters in the vicinity of sensitive crops. Examples of these formulations are the isopropyl and butyl esters commonly found on the market. Low-volatile esters give off less fumes than the other esters,

(Continued)

but they still may be volatile at high temperatures. Amine formulations are considered non-volatile and are the safest type of 2,4-D to use if there is a possibility of accidental crop injury.

3. Never apply 2,4-D to weeds next to a tomato field or grape vineyard regardless of the form of 2,4-D and wind direction.
4. Never operate a sprayer so that it applies 2,4-D as a fine mist that can be carried long distances. Keep boom pressures below 40 pounds so that the spray droplets will be larger and less likely to drift.
5. If the post-emergence use of 2,4-D in corn creates too much possibility of injury, consider using a pre-emergence chemical at planting time.
6. If treating brush with 2,4-D and 2,4,5-T would be too hazardous in certain areas, use basal applications, preferably during the dormant season. If brush treatments are made during the growing season near susceptible crops, use non-volatile chemicals, such as "Ammate" (ammonium sulfamate) and "Dybar" (fenuron pellets), to avoid injuring the crop.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 4, 1959

No. 110

GRAIN SORGHUM YIELDS IN ILLINOIS

Entry	1956-1958 average grain yields, bushels per acre			
	Champaign	Mason	Jackson	Pope
HYBRIDS				
1. DeKalb D50a	114	62	65	61
2. RS 610	112	61	75	70
3. Texas 620	109	*	67	50
4. Texas 601	108	*	*	*
5. Texas 660	104	*	*	*
6. Texas 611	103	*	56	43
7. DeKalb E56a	103	*	55	*
8. RS 501	101	52	62	54
9. RS 650	101	63	67	64
10. RS 590	100	*	65	47
VARIETIES				
1. Hegari	100	51	*	50
2. Redbine 60	90	*	*	41
3. Martin	86	*	55	43
4. Combine 7078	82	*	*	47
5. Combine Kafir 60	78	55	64	41
6. Midland	76	*	*	36
7. Plainsman	75	*	*	44
8. Westland	74	47	*	34
9. Reliance	55	*	*	26
Average of corn hybrids	113	46	86	57
Average of sorghum hybrids	106	60	64	56
Average of sorghum varieties	80	51	60	40

*Yields not available.

In 1956, 1957, and 1958, sorghum hybrids and varieties were widely tested in Illinois. The above table lists the results gained from these tests in different Illinois counties using 10 different hybrids and 9 varieties. As a check, three corn varieties, all adapted to their particular area, were planted at each location and their yields tabulated also. All the yields given were adjusted to 13 percent moisture and 56 pounds per bushel.

A general abundance of moisture throughout the state of Illinois in 1958 provided generally favorable conditions for corn but not always for the sorghums. Temperatures below normal and excessive moisture at Champaign apparently reduced emergence and caused slow establishment of entries. Also, the wet fall of 1957 emphasized the need for artificial drying facilities if a farmer wants to grow an appreciable acreage of grain sorghums.

The cool temperature and reduced sunlight which prevailed during much of June, July, and August in 1958 delayed blooming at some locations. At Champaign, for instance, the average number of days to reach mid-bloom was 84 in 1958 compared with 61 in 1957. At Carbondale in Jackson County, days to mid-bloom stage averaged 72 in 1958 and 62 in 1957.

The average yields for sorghum hybrids in 1958 were about 40 percent above those for the varieties, but neither were as high in yield as corn in most trials. However, in late plantings and in plantings on drouthy soils, such as the sands and claypans, sorghums may often outyield corn. This was illustrated in the dune sands of Mason County.

In northern Illinois, only the earliest maturing varieties and hybrids can be expected to reach maturity before frost. In central and southern Illinois, medium- and late-maturing varieties should be grown because of their greater yield.

Grain sorghums can also be made into silage, but can be expected to yield less than forage sorghums. For the past three years at Dixon Springs, grain sorghums averaged 9.7 tons of silage an acre, while forage sorghums averaged 14.1 tons and corn 12.6 tons.

For additional information about Grain Sorghums you can contact your county farm adviser or write the University of Illinois College of Agriculture for Bulletin 643.

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URBANA

May 11, 1959

No. 111

SOYBEAN ROW SPACING AND VARIETY GUIDE

Your Agronomy Department has been conducting field studies to determine the best row width to use for soybeans. The 1958 results of these studies, presented below, show that the 24-inch spacing was consistently better than the other row widths that were used. Even though only one year's data are presented here, the same trend has been seen in similar tests conducted for several years. The average yield difference favoring 24- over 40-inch rows is usually closer to two or three bushels rather than to the five-bushel difference recorded last year. These results seem to warrant serious consideration of the possibility of adapting cultivating equipment to closer rows and thus obtaining highest soybean yields.

Yields From 1958 Soybean Cultural Experiment at Urbana (Four Replications on Highly Productive Soil)

Row Spacing and Variety

Row spacing inches	Chippewa	Harosoy	Shelby	Clark	Average
8	36.7	44.4	38.0	38.7	39.5
24	38.5	44.8	40.1	41.9	41.3
32	34.8	40.5	35.4	38.5	37.3
40	33.5	38.3	35.8	36.9	36.1

Row Spacing and Planting Date

	May 12	May 21	May 30	June 27	Average
8	44.9	42.7	38.1	32.1	39.5
24	47.2	43.2	41.3	33.8	41.3
32	42.7	39.4	37.3	29.9	37.3
40	39.8	38.9	36.3	29.4	36.1

Planting rates in pounds per acre were 40" - 50 lb., 32" - 62.5 lb., 24" - 75 lb., and 8" - 100 lb.

1959 Recommended Soybean Varieties for Illinois (Arranged From Earliest to Latest)

North:

Chippewa, Harosoy, Hawkeye, Adams.

Central:

Harosoy, Hawkeye, Adams, Shelby, Lincoln, Clark.

South:

Adams, Shelby, Lincoln, Clark.

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No. 112

RECEIVED
JUN 4 1959

May 18, 1959

SIDE-DRESSING CORN WITH NITROGEN

Side-dressing corn with nitrogen (applying between the rows after the corn is up) is receiving increased attention by farmers. The main reason is that farmers are increasing their application of nitrogen for corn. Side-dressing is not necessarily better than plowing under or broadcasting before planting. Each method of application has advantages, and to a considerable extent personal preference, available equipment, and convenience may be the determining factors.

Why Should You Consider Side-Dressing Corn?

First let's examine the conditions under which side-dressing may be considered:

1. If not enough nitrogen was applied before or at planting time, then side-dressing is the way to correct the deficiency.
2. If unusually heavy rains occur during May and June, some leaching of nitrogen may occur, especially on sandy soils. In that case side-dressing is suggested.

Side-dressing has one special advantage: You can apply nitrogen in years when you most need it and omit it in other years. If, for example, you have a very poor stand of corn, or large areas drown out, or you are unable to control weeds early in the season, you can save the nitrogen you planned to side-dress. You can't do that with nitrogen that was plowed under before planting.

What Materials May Be Used?

Dry, liquid, or gaseous nitrogen carriers may be side-dressed. Available equipment and cost of material and application should dictate which form to use. Costs of nitrogen fertilizers should always be compared on the basis of cost per pound of actual nitrogen applied to the soil. This statement is based on tests showing that a pound of nitrogen is equally effective regardless of the form in which it is applied, provided each form is applied correctly--that is, in keeping with its chemical and physical characteristics.

Where Should the Nitrogen Be Placed?

You must consider the depth and the position in the row space at which to place the nitrogen. Depth is important from two standpoints:

1. If nitrogen is to be able to move to corn roots, it must be placed in moist soil. If it is placed in dry soil, then rainfall is necessary to move it to the roots or to allow root growth near the soil surface where it is placed.

2. Some nitrogen carriers must be discharged under the soil surface to prevent evaporation losses. Anhydrous ammonia should be placed four to six inches deep, and solutions containing some free ammonia should be placed at least one inch deep.

Side-dressing any nitrogen fertilizer directly on the soil surface is risky, because the nitrogen will not be effective if rainfall is inadequate to move it into the plant root zones.

Root damage can be avoided by side-dressing in the middle of the corn row, especially when deep-running blades or shovels are used to place the nitrogen. The problem of root damage becomes more serious as the plants get taller and their root systems become more extensive.

When Should You Side-Dress?

Nitrogen may be side-dressed any time from corn planting until the plants are too tall to permit passage of equipment. Delaying the application, however, may make it difficult to get the nitrogen into moist soil and may also increase the possibility of root damage. Therefore the best time to side-dress is before the plants are knee high.

How Much Nitrogen Should You Apply?

How much to apply depends, of course, upon your estimate of the total amount that it will pay you to use and the amount that you have already applied before or at planting time. Usual rates are 30 to 70 pounds per acre, although larger amounts can be used.

Correction

The Grain Dealers Bookkeeping School mentioned in Agronomy News No. 108 will not be held this year.

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June 1, 1959

No. 113

1959 ANNUAL AGRONOMY DAY

RECEIVED

JUN 3 1959

It is our pleasure to invite you to the third annual Agronomy Day sponsored by your Department of Agronomy at the University of Illinois. Here are the important details:

Date: June 24, 1959

Place: Agronomy South Farm

Time: 9:30 a.m. until tours are completed

The following tour program has been arranged:

Soybean Diseases	D. W. Chamberlain
Wheat Varieties	R. O. Weibel
Gametocides to Produce Male Sterility	W. J. Starnes, D. A. Miller
The 1959 Insect Outlook	H. B. Petty
New Chemicals in Weed Control	F. W. Slife, R. L. Gantz
Weed Spraying Equipment	
Alternating Corn and Soybeans	J. W. Pendleton, C. D. Bolen
Oat Varieties	C. M. Brown
Alfalfa Variety - Management Study.	D. W. Graffis
Shading Studies on Corn	E. B. Earley
Water Utilization by Corn and Soybeans.	L. C. Johnson, F. D. Whisler
Soybean Spacing, Rates, Dates	H. H. Hadley, R. L. Bernard
Soil Fertility Studies.	A. L. Lang, L. B. Miller
Dwarf Corn Row Spacing and Population Studies.	D. E. Alexander, R. L. Harrison
Minimum Tillage	J. V. Baird
Orchardgrass-Brome-grass Mixture Management.	S. G. Carmer, B. J. Gossett
Profile of South Farm Soils	R. T. Odell, L. J. McKenzie
Oat Drill-Box Survey.	W. O. Scott, J. C. Hackleman

Besides the tour, we plan to have a brief lunch-time program with remarks by Dean L. B. Howard, descriptions of the soils of Illinois and the Agronomy Research Centers throughout the state by R. T. Odell, and comments on the 60th anniversary of the Agronomy Department by O. H. Sears.

We plan to have available sandwiches, ice cream, and cold drinks. This will be handled by the Field and Furrow Club of undergraduate students.

We cordially invite you to attend this important annual tour of research in soils and crops.

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August 17, 1959

No. 114

SIXTY YEARS OF SERVICE TO ILLINOIS FARMERS

The Department of Agronomy at the University of Illinois was established officially on August 16, 1899. Long before that time, however, investigations of crop and soil problems had been under way. The Morrow Plots, oldest soil experimental plots in America, had been in existence 33 years when the department was officially recognized. In the opinion of P. G. Holden, first head of the department, the word agronomy was used for the first time at Illinois to designate the area of work in crops and soil.

Many persons identified with this department have made noteworthy contributions through the years. Three striking examples in the area of crop production are the development of hybrid corn, the use of alfalfa as a forage crop, and the rapid expansion of soybean crop acreage.

It has been said that "the star of hybrid corn first shone over the peaceful campus of the University of Illinois." Although many people have played their parts, Edward Murray East, M.S. 1904 and Ph.D. 1907, was largely responsible for the brilliance of that star. Since that time the use of new hybrids, developed as a result of corn breeding research, has added 20 bushels an acre to Illinois corn yields.

The soybean crop is relatively new to some areas of the United States, but not to Illinois. As early as 1896 an Illinois agricultural experiment station bulletin contained results of investigations with this crop. Illinois is recognized as the leading state in soybean production. For many years more acres of soybeans were grown here than in all other states combined. Even now more than one-fourth of the soybeans grown in the United States are raised on Illinois farms. The tremendous popularity of this crop began about 1920 as a result of research and extension activities.

Before 1902 alfalfa was believed not to be adapted to the soils and climate of Illinois. At that time the absence of suitable nodule bacteria and the need for limestone to correct soil acidity were shown to be responsible for alfalfa failures in the state. Now more than two million acres of this crop, seeded alone and in mixtures, are grown in Illinois.

Many examples could be given of outstanding contributions made by Illinois in the field of soil science: development of one of the strongest soil survey programs in the United States, establishment of the most extensive system of field culture experiments by any agricultural experiment station, and many other firsts.

The philosophy of soil fertility and permanent agriculture developed by Dr. Cyril G. Hopkins was a product of early investigations in soils. This philosophy was based on the concept that land passed to posterity should be richer--not poorer--than when it was taken over.

The most comprehensive soil-testing program in the United States is the result of research conducted since 1920. In 1958 more than two million acres of land were tested at 122 extension and commercial soil-testing laboratories.

As it has done in the past, the work of the Agronomy Department will continue to supply Illinois farmers with the kind of factual information that will enable them to make sound management decisions.

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AGRONOMY

CROPS AND SOILS

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THE 1959 ILLINOIS WINTER WHEAT CROP

Average Yields (Bushels per Acre) of Winter Wheat
Drill Plot Tests Conducted at Three Locations in Illinois

Variety	No. Ill. Field (DeKalb)			Urbana			Brownstown ¹		
	2 yr.	3 yr.		2 yr.	3 yr.		2 yr.	3 yr.	
	1959	1958-59	1957-59	1959	1958-59	1957-59	1959	1958-59	1957-59
SOFT WHEATS									
Monon	18	--	--	28	30	27	17	--	--
*Knox	17	30	34	26	28	27	29	35	34
*Vermillion	29	36	35	24	29	26	39	40	36
Ill. 53-818	25	--	--	26	29	24	34	35	--
LaPorte	25	34	34	23	26	22	25	34	36
*Dual	23	33	34	31	34	30	36	39	37
Todd	15	28	--	23	29	23	31	37	--
Ill. 53-373	26	31	--	27	28	26	41	--	--
*Seneca	10	26	29	23	28	23	24	37	37
Lucas	15	29	31	22	29	25	23	34	32
*Saline	20	33	33	28	32	29	41	42	39
Racine	33	40	--	33	36	33	44	43	--
Average	21	32	33	26	30	26	32	37	36
HARD WHEATS									
*Triumph	28	35	37	39	36	31	36	37	--
Bison	21	--	--	28	28	23	25	--	--
*Pawnee	30	36	35	30	34	29	36	36	32
*Ponca	20	31	32	33	34	32	37	35	33
Concho	21	33	33	34	33	27	29	31	27
Crockett	17	--	--	35	33	--	30	--	--
*Westar	23	33	32	24	30	35	30	33	27
Average	23	34	34	32	33	27	32	34	30

*Varieties recommended in Illinois.

¹/ Average of two replications.

The 1959 growing season for winter wheat was an unusual one. According to the Illinois Crop Reporting Service, 1,686,000 acres of winter wheat were seeded in the state last fall. Most of the crop was planted on schedule and under favorable seedbed conditions. As a result, most fields had good stands and had made satisfactory growth by early November. Following this good start, weather conditions placed severe stress on the crop. The sharp drop in temperature, with no snow cover, in late November and again in mid-December severely damaged top growth and no doubt injured the crowns of the plants as well. This temperature drop was followed in a wide area of central and northern Illinois by an ice sheet which covered the ground from one to four inches deep. Heavy rains following the ice cover left some fields under water for several days. All of this added up to severe winter-killing in many areas. Some fields were abandoned; others were patched up with spring wheat or oats.

Yields are lower this year than last, but the quality is generally better as the result of a very favorable harvest period. Diseases caused some of the reduction in yield. Scab was prevalent over much of the state. Loose smut infection was high in untreated fields of Knox and Dual. Vermillion continues to show good field tolerance to loose smut. Leaf rust was severe on susceptible varieties in the southern one-third of the state. Stem rust, Septoria and mildew, could be found in most fields but was not generally severe enough to cause yield reductions.

Varieties

Knox is the leading soft red winter wheat variety in the state. Vermillion, which is more winter-hardy and less susceptible to loose smut, is increasing in popularity. Monon, a new release from Indiana, shows promise in Illinois. It is about two days earlier and two inches shorter than Knox and has the winter-hardiness of Vermillion and the Hessian fly resistance of Dual. It is similar to Knox or Vermillion in straw strength and leaf rust resistance. It has not yet been approved for certification in Illinois. Seed is not available for 1959 planting. Other recommended soft red winter wheat varieties are Dual, Saline, and Seneca. There is no change in the recommendations for the hard red winter wheats. Pawnee continues to be the most popular variety, with Ponca second. Triumph and Westar are also recommended.

Recommendations for 1959 Seeding

1. Choose an adapted variety.
2. Clean and treat your seed.
3. Prepare a good seedbed and plant on time.
4. Sow six pecks per acre.
5. Drilling or broadcasting superphosphate, equivalent to 30 or 40 pounds of P_2O_5 , with the wheat at seeding time is usually profitable when adequate nitrogen is available or applied.

The information in this issue of Agronomy News is taken from AG1834. If you would also like to have the 1959 data on test weight as well as yield for several locations, ask your county farm adviser for this Agronomy mimeographed publication.

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WINTER BARLEY, A FEED INSURANCE CROP

Winter barley is growing in popularity in southern Illinois. It provides good feed insurance, is an excellent grain for feeding, and makes good fall and early spring pasture. It is economical too; it costs 30 percent less to produce an acre of barley than an acre of corn. In addition, it is a good companion crop for establishing legumes, provides excellent erosion control, and fits well into rotations.

If you plan to grow winter barley, be sure to choose an adapted variety. This is the first and most important step in obtaining high yields. The four following varieties have been outstanding performers in Illinois tests: Hudson, Kenbar, Dayton, and Mo. B-475. Hudson and Mo. B-475 can be grown in the southern half of the state. Kenbar and Dayton are the least winter-hardy and should be grown only in extreme southern Illinois.

Since barley is less winter-hardy than wheat, plant it around September 20 so that it will become well established before winter. Cleaning and treating the seed before planting will also insure better stands and more vigorous plants. Make sure that the seedbed is properly prepared and that the soil fertility level is high. Do not plant barley on land that tends to be low and wet, as this crop cannot stand wet feet.

Plant barley with a drill at the rate of two bushels an acre. For more information on winter barley, ask your county farm adviser for Circular 782.

AVERAGE YIELDS (BUSHEL PER ACRE) IN WINTER BARLEY PERFORMANCE TESTS CONDUCTED AT FOUR LOCATIONS IN ILLINOIS

Variety	No. Ill. Field (DeKalb) ¹ / ₂	Urbana ¹ / ₂		Brownstown		Carbondale	
	1958	1958	2 yr. 1957-58	1959	3 yr. 1957-59	1959	3 yr. 1957-59
*Kenbar	69	78	46	59	63	46	49
*Hudson	73	104	58	60	66	45	50
*Mo. B-475	80	87	51	59	65	41	51
*Dayton	65	79	49	60	67	50	51
Decatur	78	79	48	52	55	55	49
Kearney	58	80	47	53	53	--	--
Kentucky #1	71	71	47	47	59	54	55
Kenate	70	92	56	63	68	43	48

*Varieties recommended in Illinois.

¹/₂ All varieties were completely winter-killed in 1959.

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THE DRILL BOX SURVEY FOR WINTER WHEAT

A survey has been taken in Illinois on seed wheat used on 602 farms in 29 counties. From this survey the University of Illinois reports that, while most farmers were sowing good seed, some were still planting low-germinating and impure seed.

About six percent of the samples germinated below 80 percent. Some dropped to 30 percent.

The survey also showed that 17 percent of the seed had not been cleaned. The uncleaned seed carried three times as many common weed seeds and five times as many secondary noxious weed seeds as the cleaned wheat. Curled dock and wild garlic were the secondary noxious weeds that were found most often. One sample carried over 400 wild garlic bulblets per pound. Cheat was the most prevalent common weed.

Although 83 percent of the samples had been cleaned, the quality of cleaning varied. Farm-cleaned samples averaged six secondary noxious weed seeds and 19 common weed seeds per pound of wheat. Samples cleaned by seed dealers or elevators averaged only one secondary noxious and seven common weed seeds per pound of wheat. This is credited to better cleaning equipment.

Only 12 percent of the farmers were using certified seed. The certified seed was about two percent cleaner and germinated four percent higher than non-certified. The non-certified seed carried 40 times as many secondary noxious weed seeds and 30 times as many common weeds as the certified.

The survey also shows that about 80 percent of the farmers used seed from their own or neighbor's bins. They purchased the remainder from seedsmen or other sources.

It is generally agreed that there is great risk associated with farming. When we think of risks, we think of weather, seeds, insects, and diseases. Seldom do we think of man-made risks, such as planting seed without knowing whether it will grow. Farmers can do much to reduce the risks in growing wheat. The risk of non-uniform stands and excessive weeds may be reduced by proper cleaning. The risk of loss of stand by seedling diseases may be reduced by treating. The risk of a poor stand because of low viability may be eliminated by a germination test. The risk of planting seed that is poorly cleaned, that carries excessive weed seed, inert matter, or other crop seed (rye for instance), may be reduced or even eliminated by a purity analysis.

(Continued)

The following table shows how the seed was prepared and what was known about it when obtained from different sources:

Source	Cleaned		Treated		Germination test		Purity analysis	
	Yes	No	Yes	No	Yes	No	Yes	No
	%	%	%	%	%	%	%	%
All samples	83.0	17.0	61.0	39.0	22.0	78.0	14.0	86.0
From own bin	82.0	18.0	60.0	40.0	15.0	85.0	6.0	94.0
From neighbor	77.0	23.0	62.0	38.0	17.0	83.0	11.0	89.0
From seedsman	100.0	0.0	61.0	39.0	80.0	20.0	77.0	23.0
From an elevator	100.0	0.0	69.0	31.0	85.0	15.0	69.0	31.0
All certified seed	100.0	0.0	66.0	33.0	100.0	0.0	100.0	0.0

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QUESTIONS AND ANSWERS ON LIMING

DEPARTMENT OF FORESTRY

Now is a good time of the year to apply lime to soils. If your soil tests indicated that some of your soils are acid and need lime, you should apply it well ahead of next year's crops.

Here are the answers to some questions you may have about applying lime to acid soils:

Question: What is the purpose of applying lime to soils?

Answer: Lime neutralizes soil acids and supplies calcium and magnesium as plant foods.

Question: Is extra-fine limestone more effective than standard ground limestone?

Answer: The effectiveness of limestone ground to different degrees of fineness is measured in relation to the amount of time it takes the limestone to react with soil acids. Extra-fine limestone will react more quickly than the standard grind because more surface area is exposed per unit of weight and the finer particles will mix more completely with the soil.

Question: Will extra-fine limestone leach more readily and thus last for a shorter time in the soil?

Answer: Except on sands, limestone applied to acid soils leaches very slowly. Most of it is held in the soil by clay and organic-matter particles. Extra-fine limestone may not persist so long as standard limestone in the soil because it is more available to plants and thus may be used up more quickly. This is certainly not a disadvantage for the fine material.

Question: Will it cost more to use extra-fine limestone than the standard size?

Answer: In some areas in Illinois, extra-fine limestone is offered in limited amounts at favorable prices and is a real bargain for farmers. In other areas it is not available. In some areas fine grinds are priced so high that standard grinds which contain a large proportion of fine material are the better bargain.

Question: Is calcium, which is a constituent of limestone, often lacking as a plant nutrient in the same way as nitrogen, phosphorus, and potassium are lacking in Illinois soils?

Answer: No. Research indicates that there is plenty of calcium to meet the nutritional needs of plants in nearly all Illinois soils.

- Question: Are there areas of magnesium deficiency in Illinois?
- Answer: Only small areas of sandy soils near Kankakee have thus far been found to respond to magnesium applied to field crops.
- Question: Do you need to correct an imbalance of calcium and magnesium even though both are present in good supply?
- Answer: Research by the Department of Agronomy at the University of Illinois showed that the ratio of calcium to magnesium could be varied over a wider range than is found in Illinois soils without affecting plant growth significantly.
- Question: Is overliming injury likely from heavy applications of limestone?
- Answer: This likelihood is extremely remote. Applications of up to 20 tons per acre at the Brownstown Research Center were not detrimental to crop yields. However, large applications are not likely to be economical, particularly if soil tests show that the soils are sweet and do not need lime.
- Question: Will it pay to drill 200 to 300 pounds of fine lime per acre with soybeans?
- Answer: Limited research data obtained by some limestone producers have shown good results for this practice in southern Illinois. In general, with cropping systems that include alfalfa, clover, or lespedeza, such light liming on strongly acid soils is not a substitute for the usual liming program based on soil tests. It may apply on moderately acid soils where a corn-soybean cropping system is followed. If you use this practice, leave check strips to compare with the treated areas.
- Question: Should acid soils be limed up to the same pH in cash-grain farming systems as in rotation systems that include a forage legume, such as alfalfa or clover?
- Answer: Liming strongly acid soils will increase yields of all field crops. However, many field crops do not require so much lime as legumes like alfalfa or lespedeza. Therefore, it may be economical to apply less lime when legumes are not included in the cropping system.

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MOISTURE CHANGES IN EAR CORN DURING CRIB STORAGE

Usually ear corn goes into cribs in Illinois at a fairly high moisture. In some years the moisture content of ear corn on Illinois farms is so high that farmers are greatly concerned about shrinkage and safe storage of the corn in the crib.

The University of Illinois Department of Agronomy in cooperation with the Department of Agricultural Engineering has made extensive studies on critical moisture levels for safe storage of corn and shrinkage in the crib. For recent studies, ten lots of corn were stored in slatted cribs 6 feet wide and 8 feet long and holding 250 bushels each. The studies were conducted over a two-year period. Changes in moisture content of both cobs and grain are shown in Table 1.

Table 1. Average Monthly Moisture Change in Cobs and Grain During Storage

Month	Average moisture content of grain %	Average moisture content of cob %
November	21.3	29.9
December	19.1	23.9
January	18.4	23.1
February	17.6	18.9
March	16.0	16.3
April	14.3	13.2
May	12.5	11.0
June	12.0	10.4
July	11.1	9.4
August	11.7	10.1
September	12.1	10.5
October	12.4	10.8

The tests showed that after the minimum level had been reached in July and August the moisture content of both grain and cobs rose gradually. The increase in moisture was probably due to a decrease in air temperatures and an increase in humidity. The grain and cobs had about the same moisture content, around 16 percent, in March. On further drying, the cobs lost more water than the grain.

To get information on critical moisture levels of corn for safe storage, cribs containing corn at different moisture levels were observed. Results indicated that there was no kernel damage as long as the moisture content had dropped below 18.5 percent by March. However, at the 20 percent moisture level, damage

amounted to 3.9 percent; and as the moisture level increased above 20 percent, the amount of damage also increased. For example, corn that contained 35.1 percent moisture showed 71.2 percent of damage.

The experiments also showed that cribs with an A-frame structure reduced the amount of damaged corn by about 28 percent and also hastened drying. Damage in high-moisture corn was due to growth of fungi and bacteria.

Shrinkage of corn in storage is largely due to loss of moisture. The extent of shrinkage can be determined if the following calculation is made:

$$\frac{100 - \text{moisture content at beginning of storage}}{100 - \text{moisture content at end of storage}} \times \text{total bushels}$$

This does not take into account losses due to rodents or handling.

Some recent experiments at the Northern Regional Research and Development Division, U. S. Department of Agriculture, Peoria, Illinois, showed that heated air was more economical as a drying agent than unheated air. However, when heated air is used, the temperature should be kept below 130 degrees. Too high a drying temperature causes changes in the starch of the grain that make it difficult to separate the starch and protein fractions when corn grain is processed. High temperatures also affect the viability of the seed. Grain that germinates well will usually also process well.

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WHAT HAPPENS TO NITROGEN FERTILIZERS APPLIED DURING THE WINTER

Many Illinois farmers have found it more convenient to apply nitrogen fertilizers in the late fall or winter than in the spring. However, since the fall-applied fertilizer lies in the soil for some time before the plants use it, some of the nitrogen may be lost by leaching or by conversion to gas by soil microbes. The extent of the loss will depend on the weather, soil conditions, and possibly the kind of nitrogen carrier that is used.

When considering winter applications of nitrogen fertilizers, we would like to know how efficient such a practice will be under different rainfall conditions. In other words, how much of the nitrogen added in the fertilizer will be leached from the soil; how much will be lost through the action of soil microbes; how much will remain in the soil after a crop has been grown; and, most important, how much of this nitrogen will the crop itself be able to use?

Previous experiments at Urbana have shown that the greater the amount of water added to the soil ("rainfall"), the greater the nitrogen loss through leaching. As a result, less nitrogen is taken up by the crop. The experiments just completed with the lysimeters on the Agronomy Farm help tell what happens to the nitrogen in fertilizer that is added to the soil in the winter. Lysimeters are large soil-filled containers constructed below ground for measuring the percolation of water through soils. The amount of soluble plant nutrients, such as nitrogen, carried down with the drainage water can be determined with these devices.

Nitrogen fertilizer (ammonium sulfate) containing "tracer" nitrogen was added to the lysimeters in the winter. "Tracer" nitrogen is a special kind that can be distinguished, by certain laboratory methods, from the ordinary nitrogen found in soils and fertilizers. Except for this aspect, "tracer" nitrogen is no different from ordinary nitrogen and is used just as readily by plants. Water was added at different rates to different lysimeters to imitate winters of low, moderate, and high rainfall.

During the summer, corn was grown on the lysimeters and then harvested. The amount of "tracer" nitrogen and also the total amount of nitrogen in the corn were determined in the laboratory. With this information it was possible to determine the amount of nitrogen obtained from the fertilizer. The percolation water (leachate) that drained from the soil in the lysimeters was collected and tested in the laboratory in a similar way. Results are shown in Table 1.

After the corn was harvested, a second application of nitrogen fertilizer was made during the winter. Another crop was grown the following summer, and the corn and leachate were both tested in the laboratory as before.

At the end of the second cropping season, soil samples from the lysimeters were tested. The amount of fertilizer ("tracer") nitrogen and also the total amount of nitrogen remaining in the soil were determined. Results are shown in Table 1.

Results:--In the course of this two-year study, about a third of the nitrogen added as fertilizer had disappeared, apparently having left the soil after being converted to gas by soil microbes. Over a third of the fertilizer nitrogen was still in the soil at the end of the experiment, and the other third was found in the corn and leachate. The relative distribution of the nitrogen found in the corn and leachate varied according to the amount of "rainfall" the lysimeters received. In other words, more fertilizer was eventually used by the corn when there was less winter rainfall to leach it down with the drainage water.

More than one-third of the nitrogen applied in the winter in these studies was lost without benefiting crops that followed. Data on the fate of the fertilizer nitrogen are summarized in the following table:

Table 1. Results of Lysimeter Studies on Nitrogen Fertilizers
Applied to the Soil in Late Fall or Winter

Treatment	Nitrogen recovered in pounds per acre		
	Low rainfall	Moderate rainfall	High rainfall
Leached from soil	14	33	43
Found in 2 corn crops	55	51	37
Found in topsoil (0-10")	76	72	42
Found in subsoil (10-38")	25	20	31
Total N recovered	170	176	153
Nitrogen lost	70	64	87
Total N applied	240	240	240

It should be pointed out that the conditions in these experiments were such that nitrogen losses were as large as we would ever expect to occur. Less nitrogen would undoubtedly be lost under ordinary conditions in a farmer's field.

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ROOTING DEPTH OF CORN

During normal seasons and especially during dry seasons, high yields of summer crops, such as corn and soybeans, depend upon deep root systems that can tap sub-soil moisture reserves. The main objectives of rooting-depth studies are to determine the rooting depth and volume of soil in reach of the roots of various farm crops in some of the important soil types in the state; to determine the moisture reserves in the soils to various depths; and to study possible ways of increasing rooting depths in those soils where root penetration is limited.

In highly productive soils developed from loess, such as Muscatine and Flanagan, corn roots penetrate to depths of 5 to 7 feet. In dry years they may go even deeper. In those soils developed from Wisconsin-age glacial till, found for the most part in northeastern Illinois, corn roots penetrate to 4 or 5 feet where the till is medium or coarse textured (no finer than a loam or silt loam). In soils like Clarence silt loam, which has developed from clay till, corn roots penetrate to only 3 or $3\frac{1}{2}$ feet. Such soils have shallow profiles. The underlying dense clay till lacks structural development. As a result, roots do not penetrate it easily and air and water move through it very slowly.

The claypan soils found in southern Illinois are, in general, acid, highly leached, and lack adequate soil treatment. Most farm crops root only to shallow depths. However, with good soil treatment, including a rotation with a standover legume, such crops as corn, alfalfa, and red clover penetrate claypan soils like Cisne to a depth of 4 to 5 feet.

Corn root weights and depth of penetration as well as corn yields for various soils are given in the following table:

Soil type	Soil treatment	Root weights (lb./A.)	Depth of root penetration (in.)	Corn yield (bu./A.)
Flanagan	Not fertilized	1,398	48	66
Flanagan	Fertilized	1,846	60	79
Muscatine	Fertilized	2,008	66	81
Ringwood	Fertilized	1,802	48	101
Saybrook	Fertilized	2,460	54	68
Elliott	Fertilized	2,224	36	75
Clarence	Fertilized	1,758	38	55
Cisne	Not fertilized	743	40	20
Cisne	Fertilized	2,647	60	75
Wartrace	Fertilized	3,136	48	70

At the Southern Illinois Cooperative Agronomy Research Center at Carbondale, Illinois, a series of experiments were started in August 1955 to see the effects of mixing and fertilizing a claypan soil (Weir silt loam) to various depths.

Mixing depths of 9, 18, 27, and 36 inches were used. The claypan in Weir begins at a depth of about 18 inches, so at the 27- and 36-inch depths the claypan was disturbed and mixed with the silty surface soil.

In addition to checks that received no lime, phosphate, or potash, four rates of soil treatment were used. Rate 1, the lowest rate, was 9 tons of limestone, 3,630 pounds of 0-20-0, and 1,452 pounds of 0-0-60 per acre. Rates 2, 3, and 4 were 2, 3, and 4 times rate 1.

It is yet too early to draw definite conclusions, but the four-year average (1956 through 1959) has shown no increase in corn yields for depth of mixing alone. Fertilizer at rate 1 increased corn yields an average of 40 bushels per acre over the untreated plots for the four-year period. Placing fertilizer at depths greater than 9 inches did not increase corn yields but did improve the extent of root development at the greater depths. Fertilizer rates 2, 3, and 4 stunted the corn growth and reduced yields and root penetration, especially when placed in only the upper 9 inches of soil.

Further information on corn root development on some of the soils studied is given in Agronomy Facts SM-5, SP-10, and SM-19.

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SOYBEAN VARIETY TRIALS IN ILLINOIS

Soybean variety trials were conducted at eight locations in Illinois in 1959. These tests furnish direct comparisons among varieties planted at the same time, grown on the same soil and fertility level, and cultivated and harvested in the same manner. Table 1 contains long-time yield averages, which represent the best estimate of variety differences. Varieties that are underscored are recommended for use in Illinois in 1960.

Table 1. Five-Year Average Yields of Soybean Varieties at Test Locations in Illinois, 1955-1959 (Varieties Listed in Order of Maturity, Early to Late)

Region in Illinois:	<u>Northern</u>	<u>North Central</u>	<u>East Central</u>	<u>West Central</u>	<u>South Central</u>	<u>Southern</u>		<u>Delta</u>
Location:	Shabbona	Dwight	Urbana	Girard	Edge-wood	Eldorado	Carbon-dale	Miller City
								(1957-59)
Variety	<u>Bushels per Acre</u>							
<u>Chippewa</u>	40.2	35.1*	36.0*					
<u>Blackhawk</u>	38.3	35.7	34.9					
<u>Lindarin</u>	41.6*	35.9	39.7				27.1	
<u>Harosoy</u>	43.2	38.9	37.7	39.6	37.6	37.1	27.2	
<u>Hawkeye</u>	40.2	35.6	36.7	38.0	33.4	34.1	24.6	
<u>Adams</u>	41.6	40.6	39.6	40.0	33.0	34.2	25.9	
<u>Ford</u>	40.3	37.2	40.2	39.3	36.2	37.5	20.1	
<u>Lincoln</u>	39.6	35.3	38.1	38.6	33.3	34.3	24.1	
<u>Shelby</u>	39.9	37.1	40.5	42.3	37.8	41.0	26.2	
<u>Clark</u>			41.7	44.8	39.2	43.3	25.3	40.8*
<u>Wabash</u>					35.5	38.0	23.7	34.2
<u>Dorman</u>								37.5
<u>Ogden</u>								35.7
<u>Lee</u>								37.7

*Only four years of data for this variety. The figure has been adjusted to make it comparable with other figures.

Following are the varieties recommended for use in Illinois in 1960:

Chippewa is a very early variety, maturing at Urbana about the last of August. It is recommended for the northern two tiers of counties in the state. One percent of the total acreage in Illinois in 1959 was Chippewa.

Lindarin was added to the recommended list in 1959; however, seed will not be generally available for wide distribution until 1961. This variety matures about the same time as Harosoy and resists lodging much better. The leaves show a marked waviness on the outer edges. The plant is rather short, but pods are sparse near the base, helping to reduce combine loss. Lindarin has performed better than Hawkeye in Illinois, but has not outyielded Harosoy in most tests.

Harosoy, a variety originating in Canada, matures about nine days later than Chippewa. It is recommended for the northern half of Illinois. Harosoy was the leading variety grown in Illinois in 1959, being planted on 33 percent of the total state acreage.

Hawkeye matures about three days later than Harosoy. From 1951 to 1958, Hawkeye was the leading variety grown in Illinois, and in 1959 it represented 26 percent of the total acreage.

Adams matures about three days later than Hawkeye and will generally outyield Hawkeye, and in some cases Harosoy, in the central half of the state. Eleven percent of the total acreage in Illinois last season was planted to Adams.

Shelby, a new, high-yielding variety, is a recent development by research workers in the Illinois Agricultural Experiment Station and the U. S. Regional Soybean Laboratory. Seed of Shelby will be generally available for extensive planting in 1960. Shelby is similar to Clark in growth habit but matures six days earlier. It is similar to Lincoln in maturity and should replace all Lincoln acreage and a portion of the acreage now devoted to the slightly earlier variety, Adams.

Clark is taking over most of the soybean acreage in southern Illinois. Clark was planted on 22 percent of the soybean acreage in the state in 1959.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

December 28, 1959

No. 123

COOPERATIVE MINIMUM-TILLAGE TRIALS IN CENTRAL ILLINOIS

Minimum-tillage trial demonstrations were conducted in Christian county in 1958 and in Christian, DeWitt, and Ford counties in 1959 through the cooperation of farmers and farm advisers in these counties. In these trials, corn was planted by the plow-plant method (a once-over operation). The three trials in Christian and DeWitt counties were located on so-called gumbo soils to study minimum-tillage performance under these conditions. Results of these trials have led members of the Departments of Agronomy and Agricultural Engineering to feel that minimum tillage can improve the tilth of the fine-textured, gumbo-like soils.

Christian County Minimum-Tillage Trials on Corn (1958-1959)

Farmer	Tillage Practice	1958		1959	
		Harvested Stand stalks/A.	Yield bu./A.	Harvested Stand stalks/A.	Yield bu./A.
William Hooper, ^{1/} Edinburg	Conventional				
	(Fall-plow)	11,900	126.0		
	(Spring-plow)	13,300	114.7		
	Plow-plant	11,100	123.9		
Ted Hebert, ^{2/} Assumption	Conventional				
	(Fall-plow)	14,200	98.0	14,740	106.8
	Plow-plant	12,800	125.3	17,440	109.3
Harold Brock, ^{3/} Taylorville	Conventional				
	(Spring-plow)			13,560	100.0
	Plow-plant			14,660	99.5

^{1/} Second-year corn on Illiopolis silty clay loam and Ipava silt loam.

^{2/} Corn followed an alfalfa-brome meadow on Virden silty clay loam.

^{3/} Corn followed an oat-clover catch crop on Hartsburg silty clay loam.

DeWitt County Minimum-Tillage Trial on Corn (1959)

	Tillage Practice	Harvested Stand	Yield
		stalks/A.	bu./A.
Karl Ives, ^{1/} Wapella	Conventional		
	(Spring-plow)	14,560	113.3
	Plow-plant	13,440	96.9

^{1/} Corn followed corn on Drummer silty clay loam and Flanigan silt loam.

If a better job of plowing had been done on the Ives farm to more completely cover the trash, plant populations would probably have been more in line with those from conventional tillage. Considerable soil compaction, caused by intensive pasturing, contributed to below-optimum plowing conditions. Also, certain areas of the field were quite wet.

Ford County Minimum-Tillage Trials on Corn (1959)

Farmer	Tillage Practice	Harvested Stand	Yield
		stalks/A.	bu./A.
Blair Thackery, ^{1/} Melvin	Conventional		
	(Spring plow)	12,040	41.0
	Plow-plant	15,740	30.0
Vernon Veatch, ^{2/} Roberts	Conventional		
	(Spring plow)	8,250	65.4
	Plow-plant	14,420	55.0

1/ Corn followed oats-clover catch crop on Elliott silt loam.

2/ Corn followed corn on Elliott silt loam.

Insufficient summer rains greatly reduced yields on the Blair Thackery demonstration. Early growth of the corn was good, but later in the season, when the moisture supply was short, the plant population was too high to produce maximum yields.

Too little rain also reduced corn yields on the Vernon Veatch farm. In the area checked for yields, the corn population on the plow-plant trial was too great for the available water supply. There were ears on every stalk, but they were small.

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URBANA

January 4, 1960

No. 124

EFFECT OF MINIMUM TILLAGE ON CORN AND SOYBEANS

Illinois farmers would probably do well to consider using practices to minimize seedbed preparation next year. Efficient operation will be important in the face of rising production costs and mounting surpluses. Minimum tillage of corn and soybean fields may even offer more than an economic advantage on land that is being intensively row-cropped.

Members of the Department of Agricultural Economics say that minimum tillage (plowing and planting plus one cultivation) will reduce machine-operating and labor costs (at \$1.00 an hour) about \$3.00 an acre compared with the conventional system (plowing, disking two or three times, harrowing, planting, rotary hoeing, and cultivating twice). Another \$1.55 to \$1.75 could possibly be saved if the farmer used the time he saved to raise more livestock, farm more acres, or reduce his hired labor.

In some areas minimum tillage may supplement soil and water conservation programs, requiring less emphasis on mechanical structures and other conservation practices. Agronomist O. E. Hays of LaCrosse, Wisconsin, reported recently that minimum tillage had reduced water runoff on sloping lands by one-half and soil losses by one-third on a Fayette silt loam soil.

The table below gives average yields from three locations in Illinois for the past three years when various kinds of minimum tillage were used in comparison with a conventional system. In the conventional system, the field was plowed, disked twice, harrowed, and planted.

Method	Average yields, 1957-1959			
	Brownstown	Urbana	DeKalb	Average
Corn, bu. per A.				
1. Conventional	95.1	113.7	96.5	101.8
2. Plow, plant	91.5	106.7	95.9	92.0
3. Plow, spike-tooth, plant	94.5	109.5	97.3	100.4
4. Plow, wheel-track plant	90.1	111.4	92.9	98.1
Soybeans, bu. per A.				
1. Conventional	26.5	34.8	36.7	32.7
2. Plow, plant	27.8	33.3	38.1	33.1
3. Plow, spike-tooth, plant	27.6	32.5	37.4	32.5
4. Plow, wheel-track plant	28.1	31.8	38.4	32.8

Unusually dry weather in July and August 1959 caused some reduction in corn and soybean yields on the minimum-tilled plots at Urbana. A rotary hoe should have been used to break the clods after the seedlings emerged.

Minimizing tillage will reduce soil compaction, especially in the furrow slice. Excessive compaction may keep the roots from penetrating and branching and thus limit subsoil depths. When rainfall is limited, restricted root development may reduce yields significantly by causing certain nutrient or water deficiencies. In addition, severe compaction will restrict the diffusion of gases, especially oxygen, in the soil and interfere with the decomposition of organic matter and plowed-under residues, producing a nitrogen deficiency. Compaction is also likely to reduce the effectiveness of tile drainage systems.

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URBANA

January 11, 1960

No. 125

ILLINOIS OAT VARIETY TRIALS, 1959

The 1959 spring oat crop averaged 40 bushels an acre. This is a drop of 15 bushels an acre below the near-record crop of 55 bushels in 1958. A virus disease called yellow dwarf, or red leaf, was primarily responsible for this large decrease in yield.

Yellow dwarf was especially severe in the west-central and central parts of Illinois, where many fields were not harvested because of severe damage. In the most southern and northern parts of the state, damage was much less severe, occurring only in scattered patches and along the margins of field. Throughout the state, oats planted on fields of low fertility or those planted late suffered most damage. Yellow dwarf was largely characterized by various degrees of stunting and discoloration of leaves, which varied from a yellow-red to a reddish-brown. Many infected plants failed to develop heads, and blasting of kernels was prevalent.

Three oat varieties led in acreage planted this year. Of the total oat acreage, Clintland occupied 45 percent; Newton, 19 percent; and Nemaha, 15 percent. Clintland, Minhafer, and Newton showed a significant increase in acreage over 1958, while Clinton and Nemaha showed a significant decline. Clintland, Minhafer, and Newton varieties are recommended for seeding this year.

Clintland was hardest hit by yellow dwarf in 1959, although it was the top performer when crown rust was the problem in 1957. It was also the highest yielder in 1958.

Minhafer showed slightly less damage by yellow dwarf than Clintland in badly infested areas this year. Minhafer is also noted for its resistance to both stem and leaf rust, which have been more prevalent than yellow dwarf in past years.

Newton, which was least injured by yellow dwarf, performed best of all recommended varieties in 1959.

The table on the back gives two- or three-year average yields and test weights for spring oat varieties tested in performance trials conducted by the University of Illinois Department of Agronomy.

Variety	Shabbona DeKalb Co.		Urbana Champaign Co.		Brownstown Fayette Co.	
	2 Yr.	Test (1959)	3 Yr.	Test (1959)	2 Yr.	Test (1959)
	Av. Yield	Wt.	Av. Yield	Wt.	Av. Yield	Wt.
	bu./A.	lb./bu.	bu./A.	lb./bu.	bu./A.	lb./bu.
<u>Early</u>						
Andrew	67	34	63	40	58	34
Fayette	79	35	56	35	48	31
Minhafer	92	34	65	39	57	35
Nemaha	83	34	57	39	55	33
<u>Mid-season</u>						
Beedee	91	34	58	41	60	35
Burnett	84	35	56	39	53	34
Clarion	66	34	51	37	63	35
Clintland	84	32	59	39	56	36
Clinton	60	30	46	39	52	36
Logan	73	34	57	39	62	34
Newton	94	35	60	42	70	36
<u>Late</u>						
Garry	80	32	53	36	--	--
Sauk	74	33	52	38	--	--

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URBANA

January 18, 1960

No. 126

ILLINOIS CROP PERFORMANCE DAY

Here's where to learn the latest results of crop improvement research at the University of Illinois, Urbana.

The occasion: Third Annual Crop Performance Day

The Day: January 26, 1960

The Time: 9:30 a.m.

The Place: Room 112, Gregory Hall

The program will include reports on the commercial corn hybrid performance tests, sorghum hybrid research, experimental hybrids, alfalfa recommendations, and soybean and oat variety tests. University plant pathologists will also give special reports on corn and lawn grass diseases. The program is designed for all persons interested in crop improvement and seed production.

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January 25, 1960

No. 127

PERFORMANCE OF COMMERCIAL CORN HYBRIDS IN ILLINOIS, 1959

Increased corn acreage and generally favorable growing conditions caused the 1959 Illinois corn crop to be the largest in the state's history. Corn production totaled more than 670 million bushels, nearly 80 million bushels above the previous high set in 1958.

Each year producers of hybrid seed corn are given an opportunity to nominate hybrids for testing in various performance trials. In 1959, hybrids were grown in 17 major tests at ten locations in the state. Fifty-five companies and individuals, as well as the Illinois Agricultural Experiment Station, furnished seed for the tests.

Test fields were located at the same places as in 1957 and 1958. However, in addition to tests of normal hybrids at "regular" planting rates, two new test groups were introduced. These were tests of dwarf corn hybrids, conducted at four test locations, and of normal hybrids at increased planting rates, conducted at three test locations.

All test fields were planted by hand on land prepared in the normal way for corn. In 1959 a new method of harvesting was introduced. All plots were mechanically harvested with a slightly modified Ford one-row picker-sheller. The shelled corn from each plot was collected in a bag, weighed, and sampled for moisture percentage. No attempt was made to estimate the shelled corn lost in the harvesting operations.

Highest yields were obtained at the Galesburg test field in west north central Illinois (112.8 bushels per acre) and the Stanford test field (112.6 bushels per acre) of machine-harvested shelled corn. Average yields of "normal" hybrids at regular planting rates on the other test fields were Woodstock, 103.0; DeKalb, 106.5; Ashkum, 89.1; Bowen, 90.2; Urbana, 101.7; Greenfield, 94.7; Brownstown, 81.7; and Wolf Lake, 84.0.

In 1959, machine harvesting was successfully employed in all tests, and the reported yields may be considered representative of actual farming conditions.

The average yield of all normal hybrids tested at regular planting rates was 97.6 bushels per acre. This average compares favorably with previous hand-harvested average yields on these same test fields, which were 101.7 bushels per acre in 1957 and 101.4 bushels per acre in 1958.

Increased plant population tests were conducted at DeKalb, Urbana, and Greenfield, with 24,000 plants per acre at DeKalb and Urbana and 20,000 plants per acre at Greenfield.

In general, the increased planting rates at DeKalb and Urbana produced somewhat lower average yields and slightly higher lodging percentages than did the normal planting rates. At Greenfield the average yield at the increased rate was higher than the average yield at the normal planting rate, but lodging was much more severe.

Dwarf hybrids of the brachytic-2 type were tested at DeKalb, Urbana, Greenfield, and Brownstown. In general, yields of the dwarf hybrids were much lower than yields of normal hybrids at the same test locations.

The following table gives the performance test data of normal hybrids planted at regular rates, normal hybrids planted at increased planting rates, and dwarf hybrids planted at regular rates.

Test location	Yields of commercial corn hybrids in bushels per acre at various test locations and planting rates					
	Normal hybrids, regular rates		Normal hybrids, high rates		Dwarf hybrids, regular rates	
	Planting rate	Yield	Planting rate	Yield	Planting rate	Yield
<u>DE KALB</u>						
Best	16,000	128.7	24,000	120.7	16,000	107.8
Average		106.5		97.6		90.5
Poorest		71.7		42.2		70.0
<u>URBANA</u>						
Best	16,000	129.7	24,000	117.2	16,000	94.9
Average		101.7		89.2		70.7
Poorest		62.6		42.1		51.2
<u>GREENFIELD</u>						
Best	12,000	113.3	20,000	131.3	12,000	99.9
Average		94.7		100.5		69.2
Poorest		75.7		69.6		36.2
<u>BROWNSTOWN</u>						
Best	12,000	104.5		NO	12,000	85.0
Average		81.7		TEST		68.1
Poorest		56.3				49.0

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 8, 1960

No. 128

RESULTS OF THE 1959 SOIL SURVEY

Soil surveys are being made by the Illinois Agricultural Experiment Station in cooperation with the U. S. Soil Conservation Service in several parts of the state. The field work was completed in one county last year, and work is in the process of completion in two other counties. During the last field season (May 1 to November 1), three soil survey groups concentrated their attention on Carroll County, in northwestern Illinois; LaSalle County, in north-central Illinois; and Montgomery County, in the southern part of the state.

Carroll County's soil survey was completed last season after the party had surveyed the final 125 square miles. Soil specialists at the University are now correlating the results of the survey in preparation for publishing the soil report and soil map for Carroll County. In May a soil survey party will begin work on another county in northwestern Illinois.

Good progress was made in LaSalle County, where approximately 130 square miles were surveyed last season. This brings the total area surveyed so far in LaSalle County to approximately 756 square miles, with 396 square miles yet to survey before the work will be completed.

Likewise, Montgomery County had approximately 160 square miles surveyed last season, leaving about two-thirds of the county yet to complete.

In addition to cooperating with the Illinois Agricultural Experiment Station in making the soil survey of Illinois counties, the U. S. Soil Conservation Service is making detailed soil maps of individual farms in all parts of the state.

The soil survey serves a two-fold purpose: First, it provides an inventory of basic soil facts, including physical and chemical characteristics of different kinds of soils, such as texture, kinds of soil horizons, acidity, organic matter, etc., along with soil maps that show the distribution of the soils. These basic soil facts are interpreted for a number of purposes, like the growing of crops, engineering needs for highways, etc.

Second, the survey serves as a training ground for beginning soil scientists. In addition to experienced men, the soil survey party usually consists of college graduates and undergraduates who are interested in soils and are seeking careers in the field of soil science.

Once the soil inventory is completed, it serves as a guide to farmers and farm managers in helping them apply the best soil management practices. It answers such questions as what soils are suitable for growing various types of plants, what erosion control practices may be needed in an area, what are highway construction needs as determined by the soil properties, or what prices a farmer could afford to pay for land that he wants to farm.

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URBANA

February 15, 1960

No. 129

THE SPOTLIGHT IS ON ILLINOIS SOILS

The University of Illinois Agricultural Experiment Station in cooperation with the U. S. Soil Conservation Service is constantly gathering basic facts about Illinois soils through soil surveys. The soil surveys also interpret these facts for use in all fields of endeavor, such as engineering, economics, farming, business, and education. When completed, the soil inventory will help to guide the state's future agricultural and industrial development.

Soil surveys help to solve many problems for engineers who want a thorough knowledge of soils to help locate and design airports, radio and radar stations, dams, reservoirs, roads, buildings, and other engineering structures.

Land appraisers have any number of reasons for wanting soil data. It may be for credit or investment purposes, for use in selecting home or business sites, or for taxation purposes.

Soil inventories serve as a guide for farmers and farm managers in applying the best soil management practices to a particular soil or group of soils.

Experiment stations, extension workers, and vocational agriculture instructors need accurate information to be able to predict how soils will respond to different levels of management. Experiment stations use soil data to set up crop and fertilizer studies. County farm advisers and vocational agriculture teachers use soil maps to help farmers and students do a better job of farming.

Educators and agricultural economists continually seek up-to-date information on soils and soil conservation for use in publications, scientific papers, talks, classroom instruction, and research.

Wildlife workers find soil surveys helpful in improving wildlife areas, building ponds, and locating recreation, hunting, and fishing sites.

Credit agencies often want to know the earning power of land as indicated by its soils. Soil data give banks and other lending agencies a basis for making loans and help them make stable arrangements for repayment. On the other hand, investors find soil surveys, and the interpretations that accompany them, helpful in determining the soundness of proposed investments in land. Anyone who is planning to buy a farm should look first at the kinds of soil and their potential productivity.

Manufacturers of fertilizers, farm supplies, and farm equipment can use soil data to locate potential markets for their products. Likewise, canneries and processors want to locate their plants where they can be assured of a reliable source of products for processing. Soil maps can provide the answers.

Soil facts help to solve the problems of real estate dealers and home builders who must worry about such things as good foundations, proper drainage, operation of septic tank fields, preparation of lawns, and selection of shrubbery.

When a soil survey is completed for an entire county, a soil survey report with a soil map is published. Soil survey reports can be obtained from the Illinois Agricultural Experiment Station or the Department of Agronomy of the University of Illinois, Urbana, Illinois, on request. Since the soil survey has been active for many years and mapping techniques have been greatly improved in recent years, the older soil maps will need to be interpreted by competent soil scientists before they can be used to best advantage.

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CROPS AND SOILS

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URBANA

February 22, 1960

No. 130

HOW BAD ARE WEEDS?

Most farmers work hard to control weeds, but even with modern farm equipment some weeds are difficult to kill. Cultivator shovels can eliminate most of the weeds between corn and soybean rows, but those in the rows are difficult to destroy by cultivation unless they are covered with soil by the cultivator shovels when they are small. This is particularly true of grass weeds like giant foxtail.

There are several good weed-killing chemicals (herbicides) to help control grass weeds like giant foxtail. They may be applied as sprays or in granular form before the weeds appear (pre-emergence).

The price tag on pre-emergence herbicides has caused farmers to ask, "It it worth while to spend \$3 to \$5 extra an acre to wage a winning war against weeds?"

Your Department of Agronomy has been trying to find the answers to this question. For the past three years, research workers have studied the effect of giant foxtail on yields of corn and soybeans. The practices they used were much the same as most Illinois corn and soybean farmers use except that they left various controlled stands of giant foxtail growing in the rows with corn and soybeans and kept the areas between the rows free of weeds. Table 1 summarizes the results of this study.

Table 1. Percent of Reduction in Corn and Soybean Yields
Caused by Giant Foxtail*

Foxtail plants per foot of row	Percent of reduction in yield	
	Corn	Soybeans
50	25	28
12	16	17
6	12	10
3	9	6
1	7.5	4.5
1/2 (one weed every 2 feet)	3	3.5

* Based on data from a three-year study at Urbana, Illinois, 1957-60.

Table 1 is your "yardstick" for measuring yield losses due to giant foxtail. Here is an example of how to use it: Let's say that you are aiming for a corn yield of 100 bushels an acre. If you can count an average of 12 giant foxtail plants per foot of corn row, you can expect a yield reduction of about 16 percent (Table 1) or a cut of 16 bushels an acre in your final yield.

Here's another example: If you have soybeans in a field that can produce 40 bushels an acre when it is free of weeds, then with six giant foxtail plants per foot of row you can expect about a 10 percent reduction in yield (Table 1). This would mean a cut of 4 bushels an acre in the final yield.

How much would you be willing to invest in more effective weed control if you could harvest 16 more bushels of corn or 4 more bushels of soybeans an acre? Would you be willing to spend \$3 to \$5 an acre?

On all farms, or even in the same field, all areas may not benefit equally from pre-emergence applications of herbicides. The best way to tell whether they will pay is to count the weeds and see how serious they really are. When you are applying your pre-emergence herbicide this year, leave a few short strips as checks in the rows by shutting off the applicator. Make your weed counts in these check strips. Compare your results with those in Table 1. Then you will be able to tell whether it paid to apply a pre-emergence herbicide on your fields.

* * * * *

Agronomy News No. 126 was several days late in arriving at its destination. We are sincerely sorry, particularly if the delay caused anyone an inconvenience. The difficulty arose from the fact that the postman needs more than eight or nine days to do his part of the job. We will try not to let it happen again.

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Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 24, 1960

No. 131

NARROW-ROW SOYBEANS CAN MEAN EXTRA INCOME

Soybean growers in Illinois can increase their yields by 15 percent if they plant more rows per acre. In tests conducted at three agronomy research centers in north, central, and southern Illinois, soybeans in 24-inch rows have consistently outyielded standard 40-inch rows by about 15 percent. This means 4 to 6 more bushels an acre, depending on the productivity of the soil. In trials conducted at DeKalb, Urbana, and Brownstown during the past two years, all the varieties tested gave the best yields at the 24-inch spacing regardless of soil, climate, location, or planting date. Standability was good at all spacings except the 8-inch, and neither quality nor composition of seed was affected.

Control of weeds and adjustment of machinery to plant and cultivate in narrow rows are the major problems that farmers need to solve. Farmers have already partially solved the problem. Rear-mounted bar-type cultivators are most easily adjusted for narrow-row cultivation. A farmer may wish to fashion his own narrow-row cultivator or purchase one from his dealer. Most farmers do not usually try to adjust one cultivator for both corn and soybeans. The early weed problem will be just as great in narrow rows as in wide rows. Thus early cultivation is very important. However, the late-germinating (mid-summer) weeds are shaded out by the soybeans in narrow rows.

A grain drill, adapted for narrow rows by stopping up some of the holes, can be used for planting. Adjustable beet, bean, and corn planters can be purchased from implement dealers. For harvesting, no machinery changes are needed. Combines will harvest narrow rows just as well as 40-inch rows.

Growers should consider whether they can benefit from switching to narrow-row soybeans. Those with small acreages may not find it profitable if they have to buy new equipment. However, those with large acreages can make equipment changes pay off. An increase of 4 bushels an acre on 100 acres would mean about \$800 extra income to cover cost of the changes.

The following table gives the soybean yields for different row spacings in recent trials conducted at three agronomy research centers in the state.

Test location	Yield in bu/A at row spacing of			
	8 in.	24 in.	32 in.	40 in.
DeKalb (1959)	49.2	51.3	46.9	46.4
Urbana (1958)	41.3	42.5	38.0	37.1
Urbana (1959)	30.9	32.5	31.2	28.3
Brownstown (1959)	38.4	39.5	36.3	34.5

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 29, 1960

MAR 4 1960 No. 132

NEW PROBLEM FOR ILLINOIS SOYBEAN GROWERS

DEPARTMENT OF AGRICULTURE

The soybean cyst nematode has been found in Illinois. It was discovered by the Illinois Department of Agriculture in a single field in Pulaski county, at the southern tip of Illinois. The field was placed under quarantine in an effort to keep the nematodes from spreading to other areas. The soybean cyst nematode, first reported in Japan in 1915, was found in southeastern North Carolina in 1954 and now has a foothold in Tennessee, Missouri, Arkansas, Mississippi, and Kentucky. Nematodes spread easily and indications are that they are moving northward.

Farmers need not be alarmed about serious infestations in Illinois at the present time; but it is essential that everyone be well informed, since nematodes may become a serious problem to soybean growers in the future.

The nematodes develop within living roots of suitable plant hosts. All types of soybeans, commercial and "wild," except the black-seeded hay-type variety can become host plants. The black-seeded hay-type variety is being used in an attempt to develop new resistant varieties.

The cyst nematodes live in the soil root zone, but they may accumulate at the soil surface during heavy rains. Therefore, they can easily be carried from place to place by farm implements, machines, tools, farmers' boots, wind, runoff water, or wildlife. There are numerous ways in which they can be spread.

Farmers should be on the lookout for infestations. Newly infested areas are generally round or oval in shape with irregular borders. Plants are most seriously affected near the center of the infected area, and the effect becomes less distinct toward the patch border. The infestation usually extends beyond the patch border. Heavily infested plants are stunted and may appear chlorotic if soil fertility is low. Numerous young plants may be killed. Light infestations often do not alter the appearance of the plants in any recognizable manner. If you find suspicious areas, contact your farm adviser or the Illinois Department of Agriculture at Springfield. They will know what to do. Do not collect samples of soil or plants yourself.

The best method known at present for controlling the nematode numbers is to rotate crops in a sequence that includes non-host plants. Of Illinois field crops, soybean is the only known host plant. However, it is known that several species of beans other than soybeans (common snap beans, Mung beans, adzuki beans) are host plants. Also, lespedeza and several varieties of vetch, namely, common and hairy vetch, are hosts. Some weeds can also act as hosts. Continuing studies will surely detect others. Farmers should be careful to keep such host plants out of cropping systems that include soybeans. Good weed control is essential. Soil fumigation is too costly at present for widespread use. Infested fields should be quarantined to lessen the hazard of spreading the nematodes to other fields.

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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

March 9, 1960

No. 133

MAR 15 1960

PROGRESS FOR BETTER LIVING

Agronomy News is devoted to keeping its readers posted on the results of new research that can be applied directly to the land. New research originates from ideas. Ideas are the cells in the lifeblood of progress. Farmers are engaged in using land to provide food for the nation and a living for themselves. They need a continuing supply of new ideas to make improvements in farming techniques that will lead to a more satisfying life.

This Is Progress for Better Living

The Farm and Home Festival on March 31 and April 1 and 2 will provide a real opportunity for farmers who are interested in new ideas. This year's festival promises to be better than ever!! Come to Urbana and visit the College of Agriculture. There will be things to see, things to hear, and things to do for everyone - young and old.

Things to See!

Automatic Feed Handling
Animals and Animal Products Strengthen the Nation
Chemistry in Agriculture
Gold From the Prairie (the Soybean Story)
Keeping Records - Tools for Progress
Better Living at Home
This Is College - Careers in Agriculture for Youth
Round the World With Our College

There will be members of the staff at all exhibits to greet you, talk with you, and answer your questions.

Things to Hear!

On Thursday afternoon (March 31) a single speaking program will be centered around the general topic, "Ways to Improve Farm Family Income."

On Friday afternoon (April 1) qualified speakers will discuss "Chemicals Useful In Agriculture and Their Residues."

If the mornings, a broad variety of talks will deal with the results of research work by staff members. Factors that limit corn yields, atomic energy serving agriculture, progeny testing in crops and livestock, livestock health and marketing, and assistance given by college staff in foreign lands are among the topics to be discussed.

For the homemakers, a special program has been arranged. On Thursday and Friday mornings and all day Saturday, there will be talks by Ann Anderson of Better Homes and Gardens on family life in Russia, by Dorothy Iwig on home furnishings, by Janice Smith on families and their food habits, by Karlyne Anspach on clothing, and by William Nelson on portable flower gardens.

There will be a special Guest Day program for high school students who are planning to attend college.

Things to Do for Everyone!

Town and Country Art Show

Town and Country Talent Show

Square and Folk Dancing

Game Room - to learn a new skill for community or home fun

The Plowboy Prom

There will be plenty of good food, housing for overnight guests, and lots of room to park your car. Plan to come and enjoy yourselves - stay for three days!

REMEMBER

The Time - March 31, April 1 and 2

The Place - University of Illinois Campus, Urbana

The Event - The Third Annual Farm and Home Festival

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College of Agriculture
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UNIVERSITY OF ILLINOIS

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UNIVERSITY OF ILLINOIS

March 14, 1960

JUN 14 1960

No. 134

MORE ABOUT MANGANESE

LIBRARY

Manganese is a minor element that is necessary for efficient crop production. The most sensitive crops appear to be soybeans and oats, and soybeans are more sensitive than oats. Manganese deficiency has now been observed on calcareous sands in the Kankakee and Mason county areas and on calcareous, moderately fine-textured soils like Harpster silty clay loam and Harpster fine sandy loam. Figure 1 shows the location of known manganese-deficient areas.

Manganese helps to form chlorophyll, which gives plants their green color. Therefore, manganese-deficient plants cannot manufacture adequate chlorophyll, and the leaves develop light-colored areas between the veins. The veins remain green until chlorosis approaches the "white stage" and the leaves fall from the plant. The symptoms appear first on the youngest leaves. Analysis of plant tissue indicates that normal plants usually contain 20-45 parts per million of manganese, while the deficient ones contain as little as 3 to 5 parts per million. Since there is no good chemical method for measuring manganese in soil test laboratories, plant symptoms and leaf analysis must be relied upon to detect manganese deficiencies.

When the manganese supply in soils is at critical levels, deficiency symptoms may develop during cool weather, since temperature affects the amount of manganese that plants can use. Alkaline, poorly aerated, wet soils are apt to be low in manganese. They may also fix large amounts of the nutrient. Therefore, applying manganese fertilizers broadcast and mixing them well with the soil is likely to do little good.

When manganese deficiency symptoms develop, spraying the plants with manganese sulphate has been most successful in correcting the deficiency in Illinois. Ten pounds in 25 gallons of water per acre is a suitable rate. Indiana also recommends applying 25 to 30 pounds of manganese sulphate per acre in the row at planting time. The cost is approximately \$3.00 per acre.

Remember, a manganese deficiency may develop in soybeans or oats in Illinois on soils that are alkaline, poorly aerated, or wet. When manganese levels are critical, soybeans or oats may develop manganese deficiency symptoms during cool, wet weather. On extremely deficient soils, the deficiency symptoms will be present regardless of the weather. To date manganese deficiencies have been observed on such soils in Iroquois, Kankakee, Will, Ford, Livingston, and Woodford counties in eastern and central Illinois; in Mason, Logan, Hancock, and Adams counties in west-central Illinois; and in Whiteside, Lee, Boone, and McHenry counties in northern Illinois (see Figure 1).

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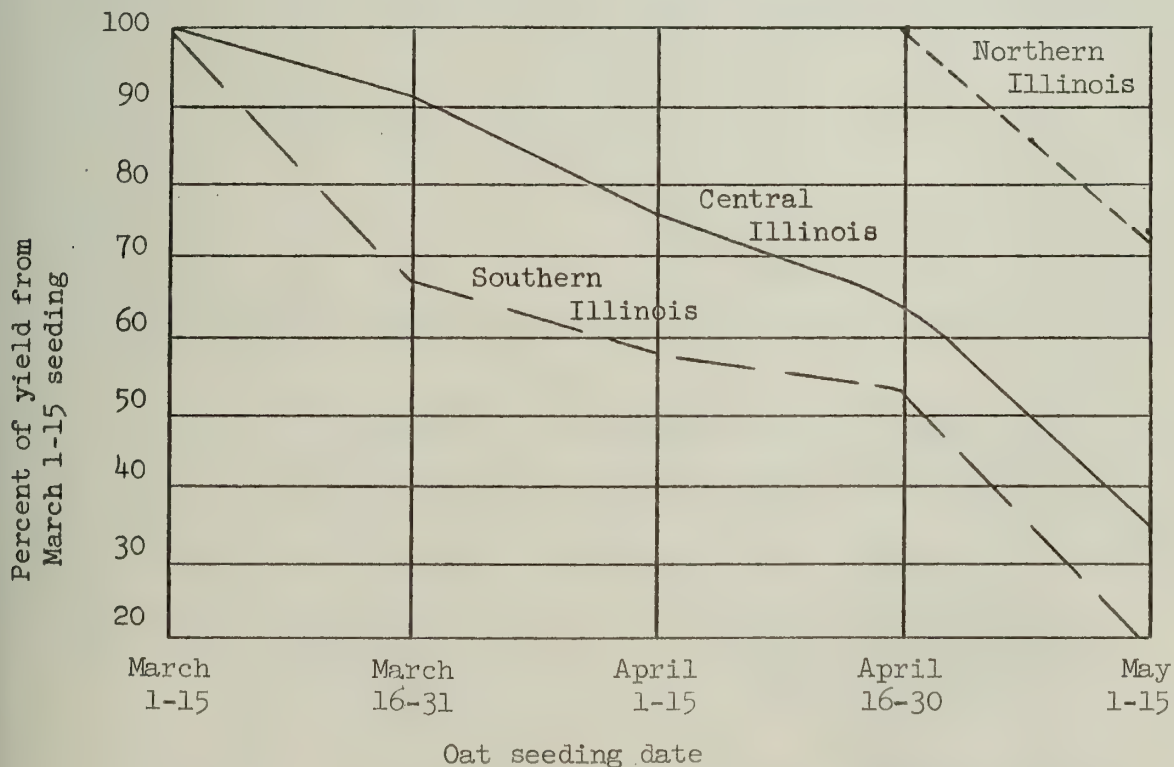
March 28, 1960

No. 135

DELAYED OAT SEEDINGS CUT YIELDS

Cold and snowy weather since mid-February has delayed oat plantings. Farmers need to decide what they will do with land they planned to seed to oats in 1960. Here are some facts that will help decide whether or not delayed oat plantings will be worth while.

Researchers in the corn-belt states have found that delayed planting lowers oat yields. The graph below shows the effect of planting date on oat yields from a study made of 33-year records on Illinois experiment fields.



In northern Illinois, oats planted in March and April gave good yields, but yields of oats planted in May were low.

In central Illinois, late March seedings gave the best yields. For April seedings there was a decrease of about 1/2 bushel for each day the seeding was delayed after April 1. Oats seeded in late April averaged 13 bushels less an acre than those seeded in March.

In southern Illinois, oats are often planted in February. Those planted in February and early March give the best yields, but each day's delay after March 16 reduces the acre yield by about 1 percent a day up to April 16. Planting after April 16 reduces yield about 1 3/4 percent for each day's delay.

Grain test weights are also affected by late seeding. In experiments at Ames, Iowa, oats from plantings on May 7 averaged 2.1 pounds a bushel lower in test weight than plantings on April 2. Yield from plantings after May 7 showed a big reduction in bushel weight.

Planting rate should be adjusted for delayed seedings. Results from Iowa also showed that the three-bushel planting rate was superior to a five-bushel rate until about mid-April. After mid-April the five-bushel rate gave best yields. These results suggest that Illinois farmers may partly overcome decreases in yield by increasing the seeding rate slightly if they plant late.

Before deciding what to do with land that was planned for oats, Illinois farmers should remember that late-planted oats produce good emergency pastures. Illinois research also shows that late planting does not affect oat silage yields as much as oat grain yields. Also, farmers will want to remember that oats are a superior nurse crop for legumes and grasses, and those who plan to establish legume-grass meadows should proceed as planned.

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NEWS

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March 31, 1960

No. 136

GOOD SOIL CULTURE PAYS OFF IN DRY YEARS

Again last year the University of Illinois Morrow Plots symbolized the importance of a good cropping system and adequate soil treatment for Illinois soils. Dry weather and varied soil treatments produced corn yields ranging from 26 to 95 bushels an acre on the nation's oldest soil experiment field. Per acre corn yields on the plots since 1955 are given below:

Year	Continuous corn				Corn-oats			
	None	LNPK* new	MLP old	MLP and NPK*	None	LNPK* new	MLP legume old	MLP legume NPK*
1955	36	86	79	98	43	97	99	107
1956	29	113	96	128				
1957	41	106	91	121	49	125	133	126
1958	31	130	84	139				
1959	26	56	83	95	45	91	95	86
3-year average ('55, '57, '59)	34	83	84	105	46	104	111	106

* New treatment applied in 1955.

On the plot in continuous corn since 1876 with no soil treatment, yields were 26 bushels an acre in 1959 compared with 31 bushels in 1958. On the continuous corn plot that received treatment of lime, nitrogen, phosphorus, and potassium in 1955, yields dropped from 130 bushels an acre in 1958 to 56 bushels in 1959. Dry weather in 1959 was the main reason for this tremendous drop. Even though the soil had plenty of nutrients, the corn plants were not able to make efficient use of them under conditions of drouth and continuous corn culture.

In contrast, the continuous corn plot receiving a manure-lime-phosphate treatment since 1904 produced 83 bushels an acre. This yield was only one bushel less than in 1958 and only five bushels below the 1955-58 average. Even though this plot has grown corn every year, the area receiving long-time MLP treatment produced 27 more bushels of corn with the amount of moisture that was available than the area receiving generous LNPK treatment since 1955. Yields climbed to 95 bushels an acre on a plot receiving manure-lime-phosphate treatment since 1904 and extra nitrogen-phosphate-potash fertilizer in 1955.

On the corn-oats rotation plot where the soil had received no treatment, corn yields averaged 45 bushels an acre compared with 49 bushels in 1957. On the corn-oats rotation plot receiving no treatment until 1955, and lime, nitrogen, phosphorus, and potash since then, corn yields were 91 bushels an acre.

The treated plots were all planted at a rate of 16,000 seeds an acre, the ideal rate for highly productive soils receiving these fertilizer treatments. There is no evidence that this planting rate hurt yields last year.

Rainfall during 1959 on the Morrow Plots presented a real contrast to that of previous years. June, July, and August rainfall totaled 5.07 inches, which is less than half the normal 10.96 inches for these months and less than a third of the 17.94 inches that fell on the plots in 1958. There were 41 days, ending on July 22, when only 0.24 inch of rain fell on the plots.

Organic-matter levels on the plots vary with the method of soil treatment as shown below:

	Continuous corn	Corn-oats
No treatment	26*	33
MLP	35	43

* Tons of organic matter per acre.

Better soil treatment has resulted in better corn yields over the years. The 1959 results add a major lesson. Where soils have a history of good treatment that maintains a suitable organic-matter level, corn plants are best able to use the available plant food in the soil during dry weather.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 4, 1960

No. 137

PRE-EMERGENCE HERBICIDES FOR 1960

Pre-emergence herbicides are weed-killing chemicals that are applied before the crop or weeds emerge. The herbicide is normally applied over the row in a 12- to 14-inch band at planting time with equipment mounted on the planter.

The following table lists chemicals recommended for 1960 and suggests amounts to apply:

Weeds	Pre-emergence herbicides	Amount to apply per acre in 12- to 14-inch band	
		Liquid ^{1/}	Granular
<u>Corn</u>			
Annual grasses	Randox	1 1/3 qt.	7 lb. (20% a. i.) ^{4/}
	Simazine	5/6 to 1 1/4 lb.	
	Atrazine	5/6 to 1 1/4 lb.	8 to 12 1/2 lb. (8% a. i.)
Annual grasses and broad-leaved weeds	Simazine	5/6 to 1 1/4 lb.	
	Atrazine	5/6 to 1 1/4 lb.	8 to 12 1/2 lb. (8% a. i.)
	Randox-T	4 1/2 qt.	10 lb. (35% a. i.)
	2,4-D ester ^{2/}	1 1/2 lb. ^{3/}	3 1/3 lb. (20% a. i.)
<u>Soybeans</u>			
Annual grasses	Randox	1 1/3 qt.	7 lb. (20% a. i.)
	Alanap ^{2/}	2/3 gal.	14 lb. (10% a. i.)
Annual grasses and broad-leaved weeds	Alanap ^{2/}	2/3 gal.	14 lb. (10% a. i.)

^{1/} For band spraying, use the indicated amount of herbicide in 7 to 10 gallons of water per acre.

^{2/} These materials sometimes cause crop injury. See discussion.

^{3/} Actual amount of active ingredient (2,4-D acid).

^{4/} a. i. stands of active ingredients. The amount listed is for material with the indicated percent of active ingredient.

Randox is recommended for control of annual grasses in both corn and soybeans. For successful control, about half an inch of rain is required within a week or 10 days after treatment. Because Randox is irritating to the skin and eyes, wear rubber gloves and goggles when using it. Do not use on sandy soils.

Randox-T is Randox with an additive. It controls most annual broad-leaved weeds as well as the annual grasses. It should be used only on corn to be harvested for grain. Wear rubber gloves and goggles to help prevent irritation to skin and eyes. Randox-T is recommended only for trial use in 1960.

Simazine and Atrazine control annual grass and broad-leaved weeds if sufficient rain falls during the 10-day period after application. Atrazine is slightly more soluble and requires less rain than Simazine. Both will be available as 80% wettable powders in 1960. Atrazine will also be available as an 8% granular. The application rate should be adjusted slightly for different types of soil. Seeding winter grain in the fall after a spring application is not recommended.

2,4-D ester (not amine) may be used pre-emergence on corn. If rain falls soon after treatment, 2,4-D gives fairly good control of annual grasses, and does a good job on broad-leaved weeds. Stands may be reduced slightly, particularly if corn is planted less than 3 inches deep. Do not use on sandy soils.

Alanap is the only pre-emergence herbicide recommended for use when broad-leaved weeds (except smartweeds) are serious in soybeans. Planting soybeans 1 1/2 to 2 inches deep will help to prevent injury. Do not use on sandy soils.

Pre-emergence herbicides are not perfect, but present information indicates that they can be expected to give satisfactory results under Illinois conditions often enough to pay good dividends for the farmer with a weed problem. They will do a good job of controlling early weeds in case rain or a shortage of labor prevents timely cultivation.

When using herbicides, be sure to read and follow the manufacturer's instructions. Use the necessary safety precautions. Calibrate your applicator accurately, and apply the recommended amounts. Make applications only at the recommended times and only to control weeds in the crops for which the herbicides are recommended.

For further information on pre-emergence herbicides, consult your farm adviser, vocational agriculture teacher, or a reputable dealer, or write to the Department of Agronomy. Ask for a copy of AG-1816 entitled "Pre-Emergence Herbicides."

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 11, 1960

No. 138

PRE-EMERGENCE HERBICIDES GRANULAR VS. LIQUID FORMS

Most pre-emergence herbicides will be widely available in both liquid and granular forms in 1960. Farmers need to decide which they will use. Here are some pointers that can help make the decision.

Granular pre-emergence herbicides are made by impregnating or soaking inert clay granules with the weed-killing chemical. The clay is the carrier for the chemical. Laboratory tests show that the clay granules release the herbicide rapidly in the presence of water. Since the granules do not stick to the foliage of plants, liquid herbicides are still preferred for post-emergence foliage treatment. Since pre-emergence herbicides are applied to the soil, either granular or liquid carriers may be used. Research to date indicates that in general the granular forms are about equal to the liquid in effectiveness with the exception of 2,4-D. With 2,4-D, the recommended rate for broadcast application of the granular form is 2 pounds of the acid per acre, while the rate for the liquid form is 1 1/2 pounds per acre.

Granular herbicides can be obtained in bags or drums. If the farmer is handling fertilizer and seed in bags, he may prefer to have the herbicide in bags also. Granulars do not need mixing with water and do not require complicated spray equipment. They drift less with the wind and may be less irritating to the skin than liquids. There is less hauling because no water is needed.

On the other hand, granular herbicides require more storage space and more handling than sprays. Because of formulation, shipping, and storage requirements, granular herbicides are more expensive than the liquid forms per pound of active ingredient. The average cost of granular materials is about 70 cents an acre more than the liquid.

Granular herbicides need special equipment for application. In 1960 several manufacturers will have granular applicators available in quantity.

A farmer who is already equipped for spraying should check prices of materials and equipment carefully and be sure that the change is economically sound before converting from liquid to granular equipment.

A farmer who does not already have an investment in liquid or granular equipment should compare prices of both equipment and materials and weigh possible disadvantages in cost against possible advantages in safety and convenience before deciding which type he would prefer.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 18, 1960

No. 139

MAKE MONEY WITH YOUR 1960 CORN CROP

Efficient production leads to more net income per bushel. It will enable a farmer to earn a satisfactory income without overproducing total bushels. A large part of corn production costs per acre are about the same regardless of yield, so practices that increase yield per acre will usually reduce the production cost per bushel and widen the profit margin.

Many factors influence yields and production costs. However, fertilization, plant population, tillage practices, seed, and weed control merit particular emphasis. The choices made and performance achieved on these factors will largely determine whether or not your 1960 corn crop is a money-maker.

FERTILIZATION: Soil tests, cropping history, and all the judgment you can muster are important in deciding what yield responses from different fertilizer treatments are likely to be. Do not automatically cut fertilizer use as prices and income decline. If you have built up large mineral reserves through past treatment, or if your soil tests indicate sufficient phosphorus and potassium, consider cutting back on these nutrients.

Nitrogen is the fertilizer that is most likely to give a profitable response for corn in Illinois, particularly when corn follows corn or some other non-legume crop.

PLANT POPULATION: To obtain a given stand will require planting 15 to 20 percent more seeds than you want plants per acre at harvest. For most areas in Illinois, a final stand of at least 14,000 plants per acre should be sought. For this rate you will need to plant about 17,000 kernels per acre. On highly productive soils that have good moisture-supplying power, you should aim for 16,000 to 18,000 plants per acre at harvest.

TILLAGE PRACTICES: Too much tillage increases machinery costs, fuel, and labor. It may result in undesirable soil compaction that limits water infiltration and restricts root development. Don't be too anxious to get into the field before the soil is completely dry. Let it dry off. Reducing tillage operations before planting is one way you can definitely cut costs without affecting yields.

PLANT HIGH-QUALITY ADAPTED SEED: Select a hybrid that has a good performance record in your community--one that stands well and has high resistance to diseases and insects.

(Continued)

WEED CONTROL: Weeds are serious profit robbers! Recent studies show that as few as six giant foxtail or one pigweed plant per foot of row may reduce corn yields 10 bushels an acre. Weeds may rob you of most of the profit from your corn crop. Use good cultural practices and reinforce them with herbicide applications as needed. Where weeds are a major problem, the \$2 to \$5 cost of pre-emergence herbicide application will probably increase your profits.

Your local farm adviser, vocational agriculture teacher, fertilizer dealer, and local seedsman are all valuable sources of specific recommendations. Members of the agronomy staff at the University of Illinois are anxious to help you make sound choices in selecting the practices that will help you lower the costs per bushel of producing corn on your farm in 1960.

* * * * *

In order to get our readers better acquainted with the staff of the Agronomy Department of the University of Illinois, it is our intention to insert short biographies of the staff from time to time when space is available.

* * * * *

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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URBANA

April 25, 1960

No. 140

WHAT ABOUT CONTINUOUS CORN?

Results of research carried on for many years strongly indicate that cropping systems which include two or more kinds of crops give the higher yields. A cropping system that includes more than one kind of crop is useful for controlling insects and disease, especially soil-borne types. In addition, it helps to maintain high yields, controls soil erosion losses, maintains soil physical condition, and best meets the economic needs of farmers who have livestock enterprises.

With the favorable climate of recent years, yields of corn and soybeans have been good, and farmers are asking about intensive cropping with corn and soybeans. There are several reasons for this interest, including a desire for greater specialization, a need to make maximum use of high-priced land, especially if it has been maintained at a high productive level, more seasonality of work, reasonably priced commercial fertilizers, recent price relationships between crops and livestock, successful experiences of a few farmers, and personal preferences.

Your Department of Agronomy is interested in presenting the results of research on cropping systems in such a way as to help farmers decide whether they can profitably use more intensive cropping practices.

Research results and farmer experience with corn monoculture or corn-soybean culture have not covered a long enough period to show whether high yields can be maintained. But both research and experience have already established that heavy use of commercial nitrogen combined with reduced soil tillage will maintain yields far higher than seemed possible a few years ago. Many Illinois farmers can still increase the productivity of their farms with commercial fertilizers and good cropping practices and thus improve their efficiency and net incomes without resorting to continuous cropping.

Yields on the Morrow Plots in 1959 were interesting because it was a very dry year. The continuous corn plots with adequate fertility treatment during the past five years but no fertility treatment previous to that time yielded only 56 bushels per acre in contrast with 95 bushels on the continuous corn plot that had a long history of good soil treatment. This yield difference illustrates the point that intensive grain cropping systems are likely to suffer less in unfavorable years if the soil has been well treated. Six years of continuous corn at the Hartsburg Soil Experiment Field (120 pounds of nitrogen) has produced an average yield of 81 bushels per acre compared with 94 bushels per acre in a corn, bean, wheat, legume catch crop rotation. The soil type at this station is largely Illiopolis silty clay loam. High nitrogen rates have failed to maintain yields as high in continuous corn as have been obtained in corn in a rotation. In spite of this, farmers may prefer to sacrifice some high yields in favor of a better economic return under a more intensive cropping system.

Success with more intensive cropping systems is determined in part by the kind of soil and its ability to withstand intensive use. Intensive cropping or continuous corn should be limited to nearly level, well-drained, medium-textured soils (silt loams or sandy loams) with a minimum likelihood of soil erosion and soil compaction. Farmers who try continuous row crops (corn and/or soybeans) should watch for these danger signals:

1. The field may be slow to dry in the spring and plowing will have to be delayed.
2. The power needed to pull the plow may gradually become greater each year.
3. The seedbed remains cloddy and is difficult to work down satisfactorily.
4. Water begins to stand longer in the low areas between the rows after rains.
5. The field dries more slowly after rains, and thus cultivation is delayed.
6. Finally, yields may decline noticeably even though adequate amounts of fertilizers have been used.

These are the warning signs. Any farmer who watches closely can recognize them by making comparisons with other fields of his own or his neighbors. Farmers who observe such warning signs should consider revising their cropping systems to restore a favorable soil physical condition and productivity level.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 19, 1960

No. 141

DOES SORGHUM ALMUM HAVE A PLACE IN ILLINOIS?

Unfavorable weather at oat-planting time this year is causing many Illinois farmers to consider the use of emergency crops. Piper, Sweet, and Greenleaf sudangrass varieties have proved to be fine emergency forage crops in Illinois. Recently sorghum alnum, also called sorghum grass, has been placed on the market in competition with the sudangrass varieties. Here are a few facts that may help Illinois farmers decide whether they would like to plant sorghum alnum.

Sorghum alnum is a tall, robust grass that is closely related to Johnsongrass, a primary noxious weed in Illinois. It has a rhizome-type root but does not run like Johnsongrass. To date there has been no difficulty in controlling it by plowing. Although the seed is somewhat larger, it is similar to Johnsongrass seed. Thus it is always a potential danger because contamination with Johnsongrass cannot be detected and highly contaminated seed could be sold on the market with little or no protection for the buyer. Sorghum alnum will also cross freely with Johnsongrass, making it possible for the invader type of rhizome to occur quickly in backcrosses to Johnsongrass. Even if the seed came entirely from sorghum alnum plants, it could contain Johnsongrass seed unless Johnsongrass were completely absent from the surrounding area.

Sorghum alnum is considered a primary noxious weed in Arizona, Indiana, Missouri, Nevada, and Washington and a secondary noxious weed in California and Georgia. In Nebraska it has been classified as a common weed and cannot be sold for seed even though it is clearly labeled.

Sorghum alnum has been described as a perennial in the southern half of the United States. However, experimenters in Oklahoma and Texas report that the crop behaves as a perennial only where winters are not severe. Minnesota reports that neither sorghum alnum nor Johnsongrass will overwinter there. University of Illinois agronomists report that this grass has not overwintered at Urbana or at Arbondale in tests so far.

Like sudangrass, sorghum alnum produces prussic acid, especially during dry summers. Both sorghum alnum and sudangrass can produce prussic acid in lethal amounts under certain circumstances. Since the regrowth of sorghum alnum contains more prussic acid than Piper sudangrass, there is much greater danger of livestock poisoning with sorghum alnum. But there is little danger of poisoning if the regrowth has reached the knee-high stage.

(Continued)

Yield results so far at Urbana and Carbondale have been no better for sorghum alnum than for the better sudangrass varieties, and the forage of sorghum alnum has been inferior. Seed costs are also higher than for sudangrass varieties. The table below shows the yields obtained in Illinois in 1958 and 1959.

	Cuttings, 1958				Cuttings, 1959			
	1	2	3	Total	1	2	3	Total
Piper sudan	1.63	1.70	0.11	3.44	1.96	1.51	1.56	5.03
Greenleaf	2.05	1.96	0.00	4.01	2.01	1.76	0.55	4.32
Sorghum alnum	--	--	--	--	1.86	2.55	0.73	5.14
Sorghum-Johnsongrass hybrid	--	--	--	--	1.77	2.26	0.70	4.73

Illinois farmers would be wise to consider these facts carefully before using sorghum alnum as an emergency crop this year.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 26, 1960

No. 142

SUNLIGHT HELPS DETERMINE CORN YIELDS

University of Illinois research agronomists are studying the effect of light on corn yields. Results from light studies show that planting too many seeds can be just as serious as planting too few. Thicker planting rates increase the amount of shade on the lower leaves. If it weren't for this, farmers could frequently get 300 bushels of hybrid corn an acre with a stand of 20,000 plants. Of course, the soil needs to supply plenty of plant food, insects and disease need to be controlled, and adequate moisture is necessary.

Research agronomists at the Urbana Agronomy Farm are shading corn plants by growing them under shade structures that vary the amount of available light. The table below shows the effect of varying amounts of light on the yield from two corn hybrids and the grain/light ratios (weight of grain per unit of light), which measure the efficiency of light use. Yields are in grams (454 grams for 1 pound). These plants were shaded from June 8 to October 1, 1956.

Light %	Hy2		WF9	
	Yield g.	Grain-light ratio	Yield g.	Grain-light ratio
63	332	5.3	336	5.3
44	236	5.4	326	7.4
25	203	8.1	262	10.5
19	145	7.6	163	8.6
13	77	5.9	35	2.7
6	9	1.5	13	2.2

These data show that even small amounts of shade can reduce yields but that light is used more efficiently as shade increases. It also shows that hybrid WF9 out-yielded Hy2 under conditions of partial shade. Corn hybrids may respond differently to self-shading when planted in thick stands. Results in 1959 show that corn plants are most sensitive to shading during ear shoot development. Shading not only reduces grain yield, but delays silking and pollen shedding. Stalk diameters and total dry weights are also reduced. Lack of sunlight causes the amount of protein to decrease, while nitrate increases. Research agronomists point out that shaded plants are unable to convert nitrates to protein. The effect of shading on silking and pollen shedding is being studied more intensively this year. Researchers also point out that new hybrids may be developed in the future that are more shade resistant than those we now use.

Even though self-shading reduces the yield maximum when corn is planted thickly, farmers need to remember to plant enough corn seeds to utilize fully the plant food and water in the soil. For 100-bushel corn soils they should aim for about 14,000 to 16,000 plants per acre. For this stand they should plant at least

16,000 to 18,000 seeds per acre. Under conditions of high soil fertility and plenty of moisture, some farmers may wish to plant somewhat thicker stands. Twenty thousand plants per acre would probably not suffer seriously from self-shading, especially if a hybrid is selected that is more shade resistant.

* * * * *



Dr. M. B. Russell (call him "M.B.") grew up near Sturgis, Michigan. He earned a B.S. degree in agriculture from Michigan State College, an M.S. degree in soil physics from Iowa State College, and a Ph.D. degree from Iowa State College. He did teaching and research at Iowa State until 1945, when he joined the agronomy staff at Cornell University. He came to the University of Illinois as head of the Agronomy Department in 1951. Dr. Russell is a noted author and international traveler, having just recently returned from Afghanistan, where he served in an advisory capacity for three months. He participates actively in teaching, research, and extension here at Illinois.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

June 3, 1960

No. 143

STOP AND COMPARE!

Research agronomists and extension personnel work hard at taking research to the farmer. A very useful and instructive method for keeping farmers informed on the latest research findings is the field plot technique. In field plots, farmers can see the newest crop varieties growing side by side, the newest ideas in tillage, irrigation cropping systems, or weed control with the latest chemicals. Field plots at research centers like Urbana are carefully designed and replicated to get reliable results. Important findings are demonstrated in less elaborate field trials in farm fields all over the state. Farmers and extension service personnel cooperate in getting such demonstrations set up. Each demonstration is carefully marked with the familiar signs.

Stop and Compare!

On your Sunday drives, look for the signs. The plots are there for you to use. Stop and compare!

The work of setting out the plots for this year is well under way. Here are some trials planned for this summer:

Corn Performance Trials

Commercial hybrids are being tested at Woodstock, DeKalb, Galesburg, Ashkum, Bowen, Stanford, Urbana, Greenfield, Brownstown, Wolf Lake.

Corn Planting Rate Tests

Urbana, DeKalb, Greenfield.

Wheat Variety Trials

Brownstown, DeKalb, Urbana, Carbondale, Dixon Springs.

Oat Variety Trials

Brownstown, Urbana, DeKalb, Knox County, Hartsburg, Elwood, Carbondale, Dixon Springs.

Soybean Breeding Trials

DeKalb, Dwight, Urbana, Girard, Edgewood, Carbondale, Brownstown, Miller City.

Leaf Spot Disease of Soybeans is being studied at El Dorado.

(Continued)

Germ Plasm Collection

This is an interesting collection of soybean seeds from all over the world used for breeding purposes. It includes some 225 well known varieties of soybeans, 2800 foreign varieties mostly from East Asia, and about a dozen varieties of wild soybeans. You can see these varieties growing at DeKalb and Urbana under the control of the U. S. Regional Soybean Laboratory at Urbana.

Forage Crops

Forage crops are being studied at Brownstown, DeKalb, Carbondale, Dixon, Dixon Springs and Urbana.

Sorghum Trials

Brownstown, Carbondale, Dixon Springs, Havana, and in Champaign County west of Urbana.

Minimum Tillage

Urbana and Carthage.

County Demonstration Plots

Farm advisers are planning some 230 trials this year of various kinds. Included are 53 oat variety trials, 62 soybean variety trials, 27 winter wheat trials, 14 winter barley trials, 75 weed control trials, and an unknown number of fertilizer trials. Farmers cooperate by conducting the trials in their fields...located in counties all over the state. Check with your farm adviser to see what trials are in your county and find out where they are located. Watch them through the summer.

Field days are planned at all the research centers. Watch Agronomy News and the Newspapers or check with your farm adviser for the dates. Plan to be there!

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J N SPAETH
220 MUMFORD HALL



AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

No. 144

AGRONOMY EVENTS Experiment Field Meetings 1960 Spring and Summer Schedule

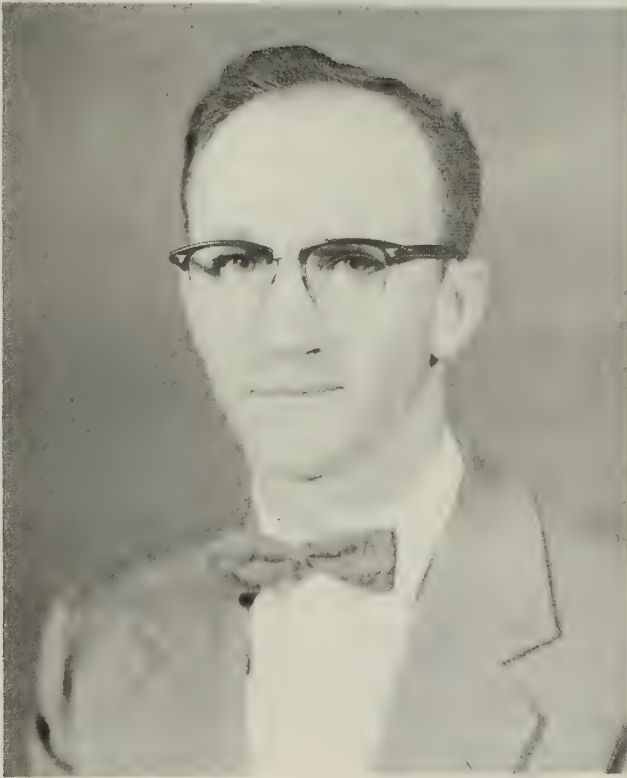
<u>Date</u>	<u>Field</u>	<u>County</u>
June 14	Newton	Jasper
June 15	Toledo	Cumberland
June 16	Carlinville	Macoupin
June 17	Hartsburg	Logan
June 24	Aledo	Mercer
June 28	Dixon	Lee
July 8	DeKalb	DeKalb
September 1	Brownstown	Fayette
September 6	Newton	Jasper
September 7	Toledo	Cumberland
September 9	Oblong	Crawford
*September	Urbana, Agronomy Day	Champaign
*September	Elwood and Joliet	Will
*September	Carthage	Hancock
*September	Clayton	Adams
	Carbondale	Jackson

*Watch your local paper for time of meeting.

Other Events

<u>Date</u>	<u>Event</u>	<u>Place</u>
June 21	Annual Meeting of Illinois Crop Improvement Association	Urbana
June 22	Annual Field Day, Illinois Seed Dealers' Association and Illinois Crop Improvement Association	Urbana
August 12-20	Illinois State Fair	Springfield
August 24-25	State Sports Festival	Urbana
September 2	Cattle Feeders Day	Urbana
September 14	Annual Agronomy Day for Farmers	Urbana
October 28	Sheep Day	Urbana

MEET YOUR EXTENSION SPECIALISTS



Sam Aldrich grew up near Fairgrove, Michigan, and attended Michigan State University, where he received his bachelor's degree. He then went to Ohio State University, completing his doctorate there in 1942. While at Ohio State he did research for both the University and the United States Department of Agriculture. In 1942 Sam joined the staff at Cornell University, where he served until 1957, when he came to Illinois to work in soil fertility extension.

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AGRONOMY

CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

URBANA

June 15, 1960

No. 145

INDEX TO AGRONOMY NEWS NOS. 100 to 145

This issue of Agronomy News is an index to all issues from 100 to 145. It will serve as a convenient guide for making your personal set of Agronomy News a useful and handy reference.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

July 28, 1960

No. 146

CORN KNEE HIGH ON FOURTH OF JULY
DOESN'T MEAN THAT YIELDS WILL BE HIGH!

Professors G. H. Dungan and A. L. Lang of the University of Illinois Agronomy Department have measured corn heights on the Morrow Plots for the last twenty-five years. Each year the height of the tip of the tallest upstretched blade in each of twenty hills per plot was measured, and results were averaged to represent the plot. The earliest planting date was May 5; and the latest, June 3.

The table below shows the relation between corn height on July 4, corn yield, and planting date for the continuous corn plots. The results include average figures for 10 years of early plantings between May 5 and May 18 and for 10 years of late plantings between May 19 and June 3. The data run from 1940 through 1959. They indicate that corn planted early was taller on July 4 than corn planted late and that corn on treated plots was taller on July 4 than corn on untreated plots. The data also indicate that the late plantings outyielded the early plantings, on the average, by about 5 bushels an acre on the untreated plots and 12 bushels an acre on the treated plots.

Planting date	Treatment	Average height inches	Average yield bu./acre
May 5 - 18	None	42.6	21.9
	MLP	67.3	61.7
May 19 - June 3	None	32.0	26.4
	MLP	54.3	73.2

On the plots in continuous corn, the corn grew tallest on July 4 in 1939, when it was 67.5 inches high on the untreated plots and 82.4 inches high on the treated plots. The untreated plots were shortest in 1957 at 24 inches, and the treated plots were shortest in 1945 at 40.6 inches. The tallest corn ever grown was in 1939 at 95.6 inches, with 40 percent of the corn in tassel.

In contrast, yields on the continuous corn plots were not related to height of corn on July 4 or to planting date. For example, in 1939, when corn was tallest on July 4, yields were 22 bushels an acre on the untreated plots and 50 bushels on the treated plots; but in 1957, when corn was shortest, the yields were 41 bushels an acre on the untreated plots and 91 bushels on the treated plots. The conclusion is that, when corn is planted before June 3 at Urbana, corn planted in late May usually outyields corn planted in the early part of May. It would appear that farmers in the area need not worry about corn yields this year if they planted their corn before June 3.

MEET YOUR EXTENSION SPECIALISTS

Jack Baird, a native of Grand Island, Nebraska, attended the University of Nebraska, where he received his bachelor's degree in agriculture in 1949 and his master's in 1951. He then went to Washington State College to complete his doctorate, which he received in 1955. After three years in the Navy, Jack joined the Illinois staff, where he is working in soil management and soil physical properties.



NOTE: In Agronomy News No. 140 entitled "Stop and Compare," we neglected to point out that radio farm news broadcasts are an important source of news about agronomy events. For this we are sincerely sorry! It is not our intention to slight a group of people who have been as helpful as our radio friends. Our hats off to you gentlemen!

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

June 28, 1960

KNOW YOUR FARM POND WEEDS

No. 147

Farm ponds are on the increase in Illinois! A farm pond can be quite an asset to the farm. Farmers have found ponds especially useful as a reserve water supply for livestock. When pleasingly landscaped and stocked with fish, they provide fresh food and recreation as well. Properly stocked with fish, many ponds supply more fish than the farm family can use. Some farmers even use their ponds for swimming. Neighbors and friends are able to share in the fun as a result.

To get maximum enjoyment and use from their farm ponds, farmers need to establish and maintain a proper balance between fish and plant life. Aquatic plants provide food and oxygen for the wildlife, but when they grow too thickly they disturb the ecologic balance between plant life and wildlife, and the productivity of the pond is reduced. Also, it becomes unsightly and fishing may be impossible. Therefore it is important to know how to control the growth of aquatic plants (weeds).

Aquatic plants can be controlled with chemical weed killers without disturbing or destroying the wildlife in the pond. However, weed-killing chemicals are selective in the plants they will control, and they can injure fish if not used carefully. Specialists at the University of Illinois and the Illinois Natural History Survey say it is important to be able to recognize the different kinds of plants and to know their growth habits so that effective control measures can be designed and used.

There are so many aquatic plants that it is difficult to identify each species or variety, but they can be classified into four plant groups that differ in their growth habits. These four plant groups also differ in the type of treatment they need for control. When farmers know which of the plant groups are becoming a nuisance in their farm ponds, effective control measures can be designed.

One group includes all aquatic plants that float freely on the pond surface and have roots reaching out into the water for sustenance. These plants drift with the wind over the pond surface or move about with the current, collecting in spots where the water is quiet or in eddies. An example of this type of aquatic plant is Lemna minor (the common duck weed), which is small, usually less than 1/4 inch in diameter, with two or more roots extending into the water.

The second group are called emergents because they grow in water three or four feet deep around the pond margins. The roots are anchored to the pond bottom, but the stems and leaves reach to the surface. Included in this group are Typha latifolia (common cattail), which is a large plant, and Dianthera americana (water willow), which represents the smaller plants in the group. Also included are a large number of other plants differing in size.

(Continued)

The third group include submersed aquatic plants. These plants grow below the water surface and may be anchored to the pond bottom by the roots, or they may drift with the wind and pond currents. An example of this group is Ceratophyllum demersum (coon tail). Its leaves have barbed teeth. Another example is Myriophyllum (water milfoil), which has a very delicate leaf structure resembling the lyre, an ancient musical instrument.

The fourth group are the Potamogeton (common submerged pond weeds). They grow in water up to ten feet deep. Potamogeton pectinatus (sago pond weed), which has a fine leaf structure resembling a fan, and Potamogeton crispus (curly leaf pond weed), with a wavy leaf usually less than 1/2 inch in diameter and serrate (toothed) margin, are examples of this group and are particularly troublesome in Illinois.

Farmers who would like assistance in identifying the weeds in their farm ponds should contact their farm adviser, the Illinois Natural History Survey at Urbana, or the district representative of the Illinois Department of Conservation.

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NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

July 7, 1960

PUBLICATIONS OF UNIVERSITY OF ILLINOIS
AGRONOMY DEPARTMENT

No. 148

The following list contains some of the most popular Agronomy Department publications of the past few years and also some more recent releases with which you may not be familiar. We present them as a guide to you in obtaining up-to-date information from your Agronomy Department. Order by number (B - bulletin; C - circular; AG - mimeograph; SR - soil report) and/or title.

Corn

- B651 1959 Performance of Commercial Corn Hybrids in Illinois
- B652 1959 Performance of Experimental Corn Hybrids in Illinois
- B658 Cornstalk Rots in Illinois
- B662 Index to Performance Records of Illinois Experimental Double-Cross Corn Hybrids Tested During 1946-1959
- AG1645 Recipe for 100-Bushel Corn
- AG1707 Effects of Planting Rate and Light Intensity on Corn Yields
- AG1709 Establishing Legumes in Corn
- AG1718 Breeding Corn Adapted for High Planting Rates
- AG1777 Nitrogen for Corn

Small Grains and Oil Crops

- B556 Soil-Borne Wheat Mosaic. 35 p.
- B659 Grain and Forage Sorghums, 1959 Performance
- C726 Crops for Emergency Plantings. 8 p.
- C774 Grain Sorghums in Illinois. 16 p.
- C782 Winter Barley: A Feed Insurance Crop for Southern Illinois. 6 p.
- C784 Winter Oats for Southern Illinois. 16 p.
- C788 Spring Oats for Illinois. 24 p.
- C813 Gearing up for Narrow-Row Soybeans
- AG1785 Grain Sorghum Variety Trials in Illinois, 1956-57
- AG1817 Illinois Oat Variety Trials, 1958
- AG1834 The 1959 Illinois Winter Wheat Crop
- AG1840 Illinois Oat Variety Trials, 1959

Legumes and Grasses

- B569 The Clark Soybean for Illinois. 4 p.
- B628 Reclaiming Illinois Strip Coal Land With Legumes and Grasses
- C559 Sweet Clover for Illinois. 24 p.
- C649 Better Farming With a Legume-Grass Program. 12 p.
- C650 Ladino Clover in Illinois. 11 p.
- C676 Soybean Diseases in Illinois. 32 p.
- C725 Growing Birdsfoot Trefoil in Illinois. 16 p.
- C727 Growing Red Clover in Illinois. 8 p.
- C740 Keeping Southern Illinois Pastures Productive. 12 p.
- C743 How to Make Good Grass-Legume Silage. 6 p.
- C756 Alfalfa. 19 p.
- C794 Soybean Varieties for Illinois. 11 p.
- AG1713 Effects of Frequency and Dates of Cutting on Dry-Matter Yields of Sudan-Grass Varieties
- AG1716 Effect of 5 Legumes and Grass Species on Performance of Pasture Mixtures
- AG1798 Forage Sorghum Variety Trials in Illinois
- AG1803 Improved Alfalfas for 1959
- AG1812 Alfalfa Trials in Illinois, 1958

Weed Control

- C718 Weeds of the North Central States. 239 p. (Charge)
- C808 Prevent 2,4-D Injury to Crops and Ornamental Plants. 15 p.
- AG1778 Controlling Johnsongrass in Illinois
- AG1816 Pre-Emergence Herbicides

Soils

- B539 Soil Building With Legumes. 16 p. Describes results from Illinois soil experiment field.
- B544 Soils of the North Central Region of the United States (Charge)
- B577 Yield and Composition of Corn Forage as Influenced by Soil Fertilization. 20 p.
- C575 How to Farm on the Contour. 6 p.

(Continued)

Soils (Cont.)

- C604 Shall We Fall-Plow or Spring-Plow in Northern Illinois? 8 p.
C663 Handling Northeastern Illinois Soils. 16 p.
C667 Protecting Your Soil. 24 p. A brief guide to sound conservation practices
C721 Limestone--How to Use It, When to Use It, Where to Use It. 12 p.
C734 Plain Talk About Soil Management. 16 p.
C758 Understanding Soils. 40 p.
C777 The Morrow Plots. 18 p.
C787 Watch Your Soil Tilth. 8 p.
C810 Save Soil With Grass Waterways. 16 p.
SR77 Henderson County Soils. 64 p.
SR78 Lawrence County Soils. 92 p.
SR79 Williamson County Soils. 72 p.
AG1562 What's in the Fertilizer Bag?
AG1571 Nitrogen Fertilizers - What They Are and How They Act
AG1578 Effect of Cropping Systems on Corn Yields and on Physical Properties of Some Dark-Colored Soils
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AG1737 Graduate Study in Agronomy. Brochure for prospective students
AG1814 Historical Record of Crop Yields in Illinois

For topics not covered here or for more specific information, write to the University of Illinois College of Agriculture, Urbana, Illinois. Also watch the Agronomy News for the latest publications of your Agronomy Department and, if possible, tune in to WILL, the University of Illinois Station, for agronomy topics to be heard Monday of each week from 12:15 to 1:00 p.m. on the Illinois Farm Hour.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 26, 1960

No. 149

ATRAZINE FOR QUACKGRASS CONTROL

Quackgrass is a serious perennial weed found in northern Illinois, particularly in the northern two or three tiers of counties. Although it produces a great amount of seed, it seems to spread primarily from the underground root system (rhizomes). The rhizomes are spread by plowing and cultivating, and each year the patches in the fields seem to grow larger. Quackgrass spreads from farm to farm by seed, however, and new infestations on farms that never had quackgrass usually come from planting grain that contained quackgrass seeds.

Rotations are seldom effective in eliminating quackgrass. To get effective control, the ground should be cultivated several times during the summer in such a way as to leave the rhizomes on the surface to dry out, and no crop should be grown. In recent years a series of new chemicals have been used to kill quackgrass. They include maleic hydrazide, amino triazole, and Dalapon. Under good conditions all three of these materials will completely eliminate quackgrass, but under certain other conditions they will fail. Dalapon has proved to be superior to the others, and it has been recommended for use in the fall or in early spring. Since there is a residual effect, new plantings should not be made for three or four weeks after the spring treatment. Because some effective results have been obtained with Dalapon, it will continue to be recommended for controlling quackgrass.

During the past four years, the Agronomy Department at the University of Wisconsin has specialized in quackgrass control, and workers there report outstanding success with Atrazine. This new compound has been used primarily as a pre-emergence treatment for controlling weeds in corn; but because of the outstanding results reported from Wisconsin and also from New York, it will undoubtedly be widely used in the future to control quackgrass.

Atrazine should be applied at the rate of 5 pounds of the commercial material in at least 20 gallons of water per acre. This rate is equivalent to 4 pounds of active ingredient per acre, since the commercial material is 80 percent pure. Because Atrazine is a wettable powder at least 20 gallons of water is needed to keep the particles suspended and provide good coverage. The material should be applied during most active growth. Quackgrass grows most actively during the early spring or fall but becomes dormant or semidormant during the summer. The fall and spring are ideal times to treat with Atrazine. If the quackgrass has gone to seed, it should be mowed close to the ground so that the new growth can be treated.

During the fall, Atrazine can be applied any time from late August until the ground freezes in late October. It can be used on harvested cornfields, soybean stubble, or legume fields that are to be plowed for corn the following year. When Atrazine is applied in the fall, the ground should not be cultivated until spring because it is necessary for fall rains to wash the material into the soil around the underground root system. Corn should be planted in the spring following the fall treatment, since the Atrazine residue may injure other crops. The year following corn, any crop can be planted because the residue in the soil will have disappeared.

The fall treatment with Atrazine to control quackgrass has been fully approved by the Federal Drug Administration and can be used safely. Wisconsin is reporting excellent results from applying half of the recommended rate of Atrazine in the early spring before corn planting. This treatment, however, has not been approved by the Federal Food and Drug Administration and cannot be recommended at present.

The University of Wisconsin reports that in four years' trials Atrazine has been used successfully as a fall treatment. It has been much more consistent than the other herbicides available for controlling quackgrass. Since it does not interfere with the cropping system or time of planting, it should have wide acceptance. Because of recent fall rains, quackgrass should be in an ideal growing condition now for this treatment.

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CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

URBANA

October 3, 1960

No. 150

ILLINOIS 1960 WINTER WHEAT STORY

The winter wheat crop averaged 29 bushels an acre in Illinois in 1960. This is an increase of 3 1/2 bushels an acre over 1959 and 2 1/2 bushels an acre over the 10-year period 1951-1960.

Wheat yields would have been even higher this year if diseases like loose smut, Septoria, scab, and soil-borne mosaic had not been so severe or if storms had not damaged the crop and delayed harvest.

Loose smut has been increasing in the state for several years. This increase is due to weather conditions that are ideal for maximum spread of the disease when wheat is heading and flowering. Also, since 1957, 35 percent or more of the wheat varieties sown (Knox and Dual) have been susceptible to loose smut.

The Hessian fly population has also been increasing for several years. Farmers should delay planting until after the fly-free date, use resistant varieties, or use Thimet phorate (10 percent granular) at the rate of 10 pounds an acre. Thimet is applied as a soil treatment to control Hessian fly. But wheat treated with Thimet phorate must not be grazed.

1960 Seeding Recommendations

1. Choose an adapted variety.
2. Clean and treat your seed.
3. Prepare a good seedbed and plant on time.
4. Sow enough seed (6 pecks under optimum conditions, or more if germination is low, quality is poor, seedbed is poor, or seeding is late).
5. Drill or broadcast superphosphate, equivalent to 30 or 40 pounds of P_2O_5 , with the wheat at seeding time, and apply nitrogen if needed.

Recommended Varieties and Yields for 1960
(4-Year Average)

	<u>Northern Illinois</u>	<u>Urbana</u>	<u>Brownstown</u>
Soft Red Varieties			
Monon	(2 yr.) 25	29	(2 yr.) 25
Knox	36	30	33
Vermillion	36	30	36
Dual	34	34	35
Seneca	28	27	37
Hard Red Varieties			
Triumph	36	34	(3 yr.) 34
Pawnee	35	33	31
Ponca	31	34	32
Westar	31	29	28

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October 10, 1960

No. 151

HOW WELL DOES ILLINOIS CORN WITHSTAND FROST?

Farmers in Illinois may be concerned this year about their late-planted corn. Here are some tips that may help them decide when corn that is late can be harvested without serious reduction of seed viability or undue loss in weight.

Research workers in Illinois and Michigan have found that corn continues to grow until the grain is well into the dent stage. At this stage the grain still contains about 40 percent moisture. Germination also continues to improve until the dent stage is reached. The following table shows the variation in test weight, moisture content of grain, and germination of corn as found by Illinois workers.

Maturity stage	Moisture in grain at harvest	Test weight per bu. lb.	Density of grain	Germination %
Milk	74.3	43.3	1.11	89.9
Late milk	58.8	49.2	1.19	96.3
Dent	43.6	56.9	1.26	98.7
Mature	28.6	57.8	1.28	98.9

These results seem to indicate that corn may be harvested without loss of seed vitality or test weight once it has dried to the 40 percent moisture level and is well into the dent stage. At this stage the kernels can scarcely be dented with the thumbnail.

Michigan workers also found that the shelling percentage increased as the moisture content decreased to 40 percent but changed little below 40 percent moisture. Shelling percentage dropped about 5 percent in corn harvested at 52 percent moisture in the late milk stage. Corn is ripe when the moisture percentage has dropped to 35 percent. More recent work indicates that where the growing season is longer, as in Illinois, corn continues to increase in test weight until the 35 percent moisture level is reached.

Corn cannot be stored safely in the crib unless the moisture is down to 22 percent, and shelled corn should be down to 17 percent moisture.

Nebraska workers have studied the effect of freezing on the germinating quality of corn. Prolonged, severe freezing during winter storage can injure germination unless the moisture content is down to 15 percent. Corn with up to 25 percent

(Continued)

moisture can withstand light autumn frosts without loss of seed viability. The following table shows how seed viability varies with moisture content of the grain when temperatures drop to 28-32° F.

Maturity stage	Moisture %	Germination %
Ripe	20-25	100
Ripe	25-30	85
Ripe	30-35	70
Dent	35-40	71
Dent	40-45	69

Farmers who have late-planted corn should consider the above information in relation to the frost hazard in their local areas when deciding how best to handle their crop.

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URBANA

October 17, 1960

No. 152

WIRESTEM MUHLY!

Farmers beware! A new enemy is gaining strength in your cornfields! Wirestem muhly, a grass common to the Illinois fence row, is now invading the cornfield. Fourteen counties in northern Illinois reported serious infestations in 1959. This weed was equally serious in northern Illinois in 1960.

How can farmers recognize wirestem muhly? What is the best method of controlling it?

Wirestem muhly closely resembles quackgrass in general appearance. Lying on the ground, its stem-joints develop roots wherever they touch. Muhly has an easily recognizable top-heavy appearance because it branches freely at the upper nodes. It differs from quackgrass by growing in solid stands, while quackgrass growth tends to be more patchy. Another difference is that muhly rhizomes (underground root stocks) are scaly, while those of quackgrass are relatively smooth.

When wirestem muhly was first noticed, weed men felt that check-row planting and two-way cultivation would control it. However, this method failed as also did Dalapon, a herbicide that is widely used in controlling quackgrass.

Muhly proved to be a tough, slow-starting perennial. Dalapon, which needs to be applied to vigorously growing grasses, could not be applied early enough to make it possible to plant corn. Reports indicate that some farmers reduce muhly infestation by delaying seedbed preparation for corn. However, the best method that has been found so far is to fallow (idle) the land. To eliminate an established stand, the fallowing period should begin immediately after the harvesting of a small grain crop. Then, with periodic tillage, the weed can be eliminated in a single year. If the fallowed field is to be planted to corn or soybeans the following spring, a good pre-emergence herbicide, such as Simazine, Atrazine or Randox, should be applied to control the new muhly seedlings. Three pounds of active Simazine or Atrazine or 4 pounds of active Randox will do the job. This treatment may be needed for a number of years, since muhly is a prolific seed producer.

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CROPS AND SOILS

NEWS

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URBANA

October 24, 1960

No. 153

LIQUID FERTILIZERS EQUAL TO DRY!

Illinois farmers can now choose between liquid and dry fertilizers. Combinations of nitrogen, phosphorus, and potassium to meet soil test requirements are available in both liquid and dry forms. Farmers need to decide which kind of fertilizer (liquid or dry) will best meet their needs.

Researchers at the University of Illinois conducted tests with liquid and dry fertilizers on corn at Elwood and Urbana in 1958 and at Elwood and Mahomet in 1959. The soil type at Elwood was Symerton silt loam; at Urbana, Drummer silty clay loam; and at Mahomet, a Catlin-like silt loam. In the 1958 test a 12-6-6 grade of both a liquid and a dry fertilizer was broadcast at 800 and 1,600 pounds an acre and plowed down, and an 8-16-0 mix in both liquid and dry forms was applied at 100 pounds per acre as a starter at planting time. At each location seeding rates were used to give stands of 12,000 and 16,000 plants per acre.

In 1959 a 15-5-5 grade of fertilizer was broadcast in both liquid and dry forms at 600 and 1,200 pounds an acre and disked in. A 6-18-6 grade of both liquid and dry forms was applied at 100 and 300 pounds an acre as a starter on untreated plots as well as on plots that had received the broadcast treatment. Seeding rates were used to give stands of 16,000 and 22,000 plants per acre.

In 1958 yield was 12 bushels an acre higher on the plots with the high plant population (16,000) than on those with the lower population (12,000). In 1959, however, yield on the lower population plot (16,000) was equal to that on the high (22,000). The probable reason was generally lower yields in 1959 due to unfavorable weather. In all treatments (both liquid and dry) where nutrients were applied in accordance with soil tests, yields were significantly higher than those on the check plots. There was also a three-bushel increase for the liquid over the dry form, but that increase was not enough to indicate any real difference.

The following table shows average corn yields at all locations and all populations.

Treatment	Bushels of corn per acre		
	1958	1959	Av.
No treatment	92	70	81
Liquid broadcast	112	80	96
Dry broadcast	110	76	93
Liquid starter	-	78	-
Dry starter	-	77	-

Treatment	Bushels of corn per acre		
	1958	1959	Av.
Liquid broadcast, Liquid starter	112	89	100
Dry broadcast, Dry starter	112	82	97
Liquid broadcast, Dry starter	113	-	-
Dry broadcast, Liquid starter	108	-	-

The form of fertilizer to use is a matter of individual choice. The factors to consider are cost per unit, machinery needed to apply the dry and liquid forms, and convenience of handling.

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October 31, 1960

No. 154

KNOW YOUR PARTS PER MILLION!

"Parts per million" is the term aquatic biologists use when applying chemicals to control weeds in farm ponds. They use "parts per million" instead of "pounds per acre" because the depth of the pond as well as the surface area must be considered. "Parts per million (ppm)" is the parts of active ingredient applied per million parts of water. For example, water milfoil, Myriophyllum sp. (for identification of farm pond weeds, see Agronomy News No. 147) can be controlled with 2,4,5-TP applied at the rate of 2 ppm, which means two parts of active 2,4,5-TP (free acid) to every million parts of water, or 2 pounds of 2,4,5-TP to every million pounds of water.

Most farmers can estimate the surface area of their farm ponds in acres. The next step is to determine the average depth. By taking a series of depth measurements across the length and two or more series of measurements across the width, a farmer can determine the average depth of his farm pond. Many farmers have contour maps of their ponds that can also be used to measure average depth. When the area of the pond and the average depth are known, the volume of water in acre feet can be calculated. An acre-foot is an acre of water one foot deep.

Once the volume of the pond is known, the rate of application can be determined. There are 43,560 square feet in an acre. If the pond covers an acre and is one foot deep, there are 43,560 cubic feet of water in this foot-acre. One cubic foot of water weighs 62.5 pounds; therefore, an acre-foot of water weighs roughly 2,700,000 pounds. Since 2.7 pounds is one millionth of an acre-foot of water, we can say that 2.7 pounds of active weed-killing chemical is one part per million (1 ppm).

The table on the opposite side shows the pounds of active ingredient needed for an application rate of 1 ppm. in ponds of various areas and depths. From this table you can find the number of pounds of active chemical you will need to control the weeds in your farm pond. For example, to treat a three-acre pond that averages four feet deep at the rate of 1 ppm. you would need 32.4 pounds of active chemical. If you need to use more than 1 ppm., multiply the dosage value from the table by the number of parts per million. Do the same thing if either the surface area or the depth of the pond is greater than the table indicates.

The basis for calculating dosage is the "active ingredient" in the weed-killing chemical formulation. For example, various chemical forms (ester, acid, etc.) of 2,4-D, 2,4,5-T and 2,4,5-TP are used in weed-killer preparations. However, the "active ingredient" in these preparations is the amount or weight of the free acid equivalent. The rate of application is based on this weight. The amount of "free acid equivalent" should be given on the label.

Granular preparations range from 5 to 20 percent of "free acid equivalent" by weight. This information is also given on the label. It should be used to determine the amount of chemical preparation to buy.

A future article will give the application rates that have been found to control some of the troublesome weeds found in farm ponds.

Amount of Active Ingredient Needed for a Rate of Application of 1 ppm.

Average depth (feet)	1 surface acre	2 surface acres	3 surface acres (pounds)	4 surface acres	5 surface acres
1	2.7	5.4	8.1	10.8	13.5
2	5.4	10.8	16.2	21.6	27.0
3	8.1	16.2	24.3	32.4	40.5
4	10.8	21.6	32.4	43.2	54.0
5	13.5	27.0	40.5	54.0	67.5

1 acre = 43,560 square feet.

1 acre-foot = 43,560 cubic feet.

1 cubic foot of water weighs 62.5 pounds.

1 acre-foot of water weighs 2,700,000 pounds.

2.7 pounds in 2,700,000 pounds of water = 1 part per million.

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November 14, 1960

No. 155

SPRING OAT VARIETY TRIALS FOR 1960

Twenty varieties were grown in replicated combine plots 1/50 acre in size at Brownstown in Fayette county, at Urbana in Champaign county, and at Shabbona in DeKalb county. Yields and test weights for the 20 varieties at the three locations are given in the table below. The varieties are listed in approximate order of maturity from early (at the top) to late (at the bottom). Varieties recommended for Illinois are marked with an asterisk.

Yield and Test Weight of Oat Varieties Grown in Drill Plot Tests
at Three Locations in Illinois, 1960

Variety	Shabbona		Urbana		Brownstown	
	bu./A.	lb./bu.	bu./A.	lb./bu.	bu./A.	lb./bu.
Tonka	64.0	40	86.2	34.6	68.7	35.8
Putnam	69.6	36	80.4	31.8	61.6	33.5
*Nemaha	67.7	34	77.1	32.3	63.6	32.5
Nehawka	68.8	32	80.7	29.4	60.0	31.8
*Minhafer	64.5	34	78.3	30.5	60.4	32.5
Macon	70.9	34	76.3	32.7	57.4	32.8
*Mo. 0-205	--	--	79.0	31.5	74.1	33.0
Andrew	59.2	33	80.0	29.9	60.9	33.0
*Shield	77.2	34	78.8	33.1	72.1	32.2
*Newton	73.1	33	76.8	33.4	68.2	33.2
Clinton	51.8	27	71.8	29.5	68.2	31.5
*Clintland	59.7	30	62.0	28.8	68.7	33.8
*Clintland 60	58.7	30	69.2	29.5	65.1	33.0
Clarion	61.2	31	76.4	31.9	68.2	32.3
*Goodfield	73.1	36	72.5	33.9	63.6	35.0
Burnett	69.8	34	83.4	32.1	--	--
*Beedee	79.2	36	89.2	32.4	--	--
Sauk	66.2	31	--	--	--	--
Portage	76.6	35	81.0	31.0	--	--
*Garry	78.1	31	81.0	29.3	--	--

(Continued)

The small differences in yields given in the table do not necessarily indicate that one oat variety is better than another. To obtain reliable results, trials need to be run for a number of years. A more complete report on tests covering a number of years and including more locations will be presented later. It will be available on request from the Department of Agronomy at the University of Illinois.

The 1960 Illinois oat crop produced 51 bushels an acre, an increase of 11 bushels over the 1959 average. Yellow dwarf, an aphid-borne virus disease, damaged the 1959 crop but was less active in 1960.

The 1960 crop yields were good in spite of a very late planting season. The cool, rainy weather that delayed oat seedings extended well into early summer and favored the late-planted oats. Oat fields were relatively free of diseases, especially rusts and yellow dwarf. Yields and test weights were depressed in some areas where storms caused lodging and delayed harvest.

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November 21, 1960

No. 156

CHEMICALS CONTROL FARM POND WEEDS QUICKLY, EASILY, AND SAFELY

Weeds can be removed from farm ponds in several ways, say aquatic biologists of the Illinois Natural History Survey. Either mechanical methods, like cutting by hand or machine, or biological or chemical methods can be used. Farmers need to decide which method of control is most practical for them. Chemicals are useful for clearing badly infested ponds quickly, easily, and safely. This issue deals only with the chemical method.

Some chemicals are toxic to fish. Some may also be toxic to livestock or may flavor milk or fish products. Recommended application rates are safe to use if label directions are followed carefully. Be sure to use only chemicals that are recommended for the weeds that are to be killed. Use the recommended application rate. Keep livestock away from treated ponds, and delay fishing for the recommended length of time to give the chemical time to disappear from the water. Heavily infested ponds may need to be treated in sections so that fish can escape to untreated areas. Large amounts of decaying vegetation in a pond can use up the oxygen supply and suffocate the fish.

The table lists the chemicals that can be used for various weed groups (see Agronomy News No. 147) and the recommended application rates.

Group and species	Chemical	Rate of application	Remarks
Emergent			
Water willow	2,4-D(20%G) ^{2/}	1 lb./430 sq.ft.	Spread on water
<u>Dianthera spp.</u> ^{1/}	2,4,5-T (L) ^{2/}	1 cup/gal. water	Wet foliage thoroughly
	2,4,5-TP (L)	" " " "	" " "
Water primrose,	2,4-D(20%G)	1 lb./430 sq.ft.	Spread on water
<u>Jussiaea spp.</u>	2,4,5-T (L)	1 cup/gal. water	Wet foliage thoroughly
	2,4,5-TP (L)	" " " "	" " "
Arrowhead,	2,4-D(20%G)	1 lb./430 sq.ft.	Spread on water
<u>Sagittaria spp.</u>	2,4,5-T (L)	1 cup/gal. water	Wet foliage thoroughly
	2,4,5-TP (L)	" " " "	" " "
Cattails, <u>Typha spp.</u>	Dalapon ^{3/}	4 oz./gal. water and 3 caps detergent	" " "
	Amino triazole	2 oz./gal. water and 3 caps det./gal.	" " "

(Continued)

Group and species	Chemical	Rate of application	Remarks
Submerged			
Coontail, <u>Ceratophyllum spp.</u>	2,4-D(20%G)	3 ppm.	Spread on water
	2,4,5-T (L)	3 ppm.	Apply below water
	2,4,5-TP (L)	3 ppm.	" " "
	Endothal (G)	5 ppm.	Spread on water
	Sodium arsenite	5-10 ppm.	Apply below water
Water milfoil, <u>Myriophyllum spp.</u>	2,4-D (G)	3-4 ppm.	Spread on water
	2,4,5-TP (L)	2-3 ppm.	Apply below water
	Endothal (G)	3 ppm.	" " "
	Sodium arsenite	5-10 ppm.	" " "
Submerged Potamogeton			
Sago pondweed, <u>Potamogeton pectinatus</u>	Endothal (G)	1 ppm.	Spread on water
Curly-leaved pondweed, <u>Potamogeton crispus</u>	Endothal (G)	1 ppm.	Spread on water
	Sodium arsenite	8-10 ppm.	Apply below water
Fine-leaved pondweeds, <u>P. spp.</u>	Endothal (G)	1 ppm.	Spread on water
	Sodium arsenite	5-10 ppm.	Apply below water

Floating-leaved pondweeds

(<u>Potamogeton spp.</u>)	Endothal (L)	1 cup/gal. water	Spray leaves on surface
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1/ Scientific names are those of Fasset (revised).

2/ L = liquid form, G = granular form.

3/ Dalapon is the common name for 2,2,-dichloropropionic acid.

Free-floating algae (filamentous) can be controlled by spraying a saturated solution of copper sulphate (blue vitriol) or sprinkling fine crystals on the floating masses. There is no known chemical control for duck weed (Lemna spp.); it must be removed mechanically.

Sodium arsenite is widely used to control many kinds of submerged aquatic weeds, but it will not control Sago pond weed.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

November 28, 1960

No. 157

THE STORY OF YELLOW DWARF

Illinois farmers! You lost \$25 million worth of oats to yellow dwarf in 1959. Fortunately, the 1960 crop was not so severely damaged. But researchers say that possible future damage cannot be underestimated. What can be done to reduce such losses?

The University of Illinois has assembled 3,000 strains of oats from all corners of the world to test for resistance to this disease. During a five-year study, oat breeding specialists allowed virus-carrying aphids to infect each oat strain. They then selected the strains that resisted the disease best. Through the diligent efforts of these men, varieties that are tolerant to the virus are being developed.

The villain is not seed- or soil-borne. It is carried by nine different species of aphids that infect plants by feeding on them. This virus was first discovered to cause yellowing and dwarfing in barley; hence its name--barley yellow dwarf.

For oat fields to have yellow dwarf, primarily two things are necessary: First, there must be a source of the virus. It can be found overwintering in our native grasses growing in fence rows or in grain fields like winter wheat. Second, the virus must find its way to the oat fields. This can occur only by means of the aphids which are capable of carrying the virus and transmitting it to the oat plants. Nine different kinds of aphids are known to transmit barley yellow dwarf virus. However, not all of them can do a good job of transmitting the virus to healthy oat plants. Therefore, for the disease to become widespread, as in 1959, those aphids that can transmit the yellow dwarf virus efficiently to the oat plants must populate the fields in large numbers after having acquired the virus in other infected plants either locally or in the south.

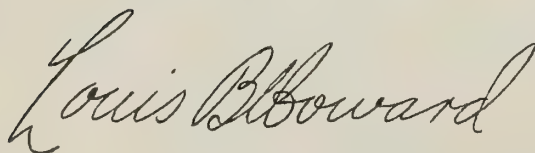
Farmers should not necessarily be alarmed about barley yellow dwarf if they see aphids in the oat fields. They may not be the kind capable of contributing to the wide spread of the disease. Also, it takes two to three weeks for the disease to show up after the fields have been infected. The aphids may have disappeared from the field long before this, and the source of the disease is therefore obscure.

How can the disease be recognized? Early symptoms are yellow-green blotches that appear near the tips of the leaves and then enlarge and extend downward to the stems. Affected parts may turn red. Root systems are damaged, and in severe cases the plants die.

(Continued)

Seedling oat plants are most easily affected by barley yellow dwarf virus. Early planted, vigorously growing oat plants are more tolerant. Newton and Putnam varieties so far have proved to be fairly tolerant to the virus, although they are affected somewhat by rusts. Farmers in areas where the disease is common may wish to try one of these varieties to decrease their yield losses. Early planting and fertilizing to get healthy, vigorous plants are the best practices that can be used at the present time. In the meantime oat breeders are continuing their efforts to breed oat varieties that are tolerant to both barley yellow dwarf and rust.

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T W CURTIN
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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

December 12, 1960

No. 158

MORROW PLOTS SHOW SURPRISING YIELDS IN 1960

The Morrow Plots, after 84 years, are still demonstrating the value of good soil management. Results over the years have shown that our rich prairie soils like Flanagan silt loam can be vigorously cropped without permanent loss of productivity. The best yields are obtained when mineral fertilizers are used regularly and when legumes are included in the cropping system. Corn yields fall to very low levels when treatments are neglected, especially when corn is grown continuously.

Some of the plots have been in continuous corn since 1888. Annual yields have been at a very low level for many years. Since 1955 parts of these plots have been treated regularly with lime and mineral fertilizers. Results indicate that depleted prairie soils respond well to treatment with lime and fertilizers. Yields on plots with the new treatments have averaged about 75 bushels an acre over yields on the untreated continuous corn plots for four years. In 1958 they came within 16 bushels of the yield obtained on the corn-oats-clover rotation.

In 1959 corn yields were low because of dry weather. One plot in continuous corn with no treatment until 1954, but treated regularly with lime, phosphorus, and potash since 1954, dropped from 130 bushels in 1958 to 56 bushels in 1959, a decrease of 74 bushels. Continuous corn plots that had been treated with manure, lime, and phosphorus for many years prior to 1954 dropped from 139 bushels in 1958 to 95 bushels in 1959, a decrease of only 44 bushels. Yields dropped less on the plots with good treatment. The corn plots with a history of good soil treatment were more productive in the dry year.

In 1960, a good corn year, corn yields were back to normal. The yield on the continuous corn plot with no treatment since 1888 is especially interesting. The yield of 50 bushels was the highest obtained since 1902. Agronomists say that plants are limited in their use of plant food from the soil on dry years. Extra nutrients thus become available for plants to use when a good year follows. Corn plants respond to the extra plant food in the soil the following year if weather is favorable; and the yields jump. The table below shows the yields obtained on all the plots, including the new treatments begun in 1954.

Corn Yields on the Morrow Plots, 1955-1960 Inclusive,
Showing Effect of New Treatments Started in 1954

Treatment	1955	1956	1957	1958	1959	1960	Average
Continuous corn untreated	36	29	41	31	26	50	36
Continuous corn *LNPK since 1954	86	113	106	130	56	96	98

(Continued)

Corn Yields on the Morrow Plots, 1955-1960 Inclusive,
Showing Effect of New Treatments Started in 1954 (Cont.)

Treatment	1955	1956	1957	1958	1959	1960	Average
Continuous corn							
*MLP since 1903	79	96	91	85	83	84	86
Continuous corn							
MLP + NPK (1954)	98	128	121	139	95	119	117
Corn-oats rotation							
untreated	44	--	49	--	45	--	46
Corn-oats							
LNPK since 1954	97	--	125	--	91	--	104
Corn-oats							
MLP since 1905	99	--	133	--	95	--	109
Corn-oats							
MLP + NPK since 1954	107	--	126	--	86	--	107
Corn-oats-clover							
untreated	63	--	--	63	--	--	63
Corn-oats-clover							
LNPK since 1954	102	--	--	146	--	--	124
Corn-oats-clover							
MLP since 1904	96	--	--	140	--	--	120
Corn-oats-clover							
MLP + NPK since 1954	101	--	--	144	--	--	122

* M = manure; L = lime; N = nitrogen; P = phosphorus; K = potassium.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

January 9, 1961

No. 159

WHAT'S NEW IN FORAGE CROP MIXTURES?

Cultivated forage crops usually consist of mixtures of legumes or legumes and grasses. Illinois farmers can vary the mixtures to fit their own particular needs. The need may be to provide good-quality pasture or quality hay for silage or dry storage (hay).

Since 1957 Illinois researchers have been studying 100 forage mixtures composed of combinations of legumes and grasses. The seedings were made in 1957, and the first yields were recorded in 1958. None of the legumes or grasses used in the 100 combinations failed to grow, and no reseeding was necessary. The table on the back summarizes yields obtained from all combinations for two years, including three cuttings each year. The trials are located at the Northern Illinois Experiment Field in DeKalb County.

Here's what University of Illinois agronomists have learned from this test so far:

Alfalfa used as the only legume in the forage mixture consistently outyielded red clover and ladino when each was used alone. In the alfalfa-ladino mixture, first-cutting yields were lower than those for other mixtures, but second- and third-cutting yields were about the same.

In alfalfa-red clover mixtures, first- and second-cutting yields were good, but third-cutting yield was reduced the first year because root rot caused the red clover to die out. In the second year (1959), the alfalfa filled in the mixture, and both second- and third-cutting yields were good.

Mixtures with timothy as the only grass were generally better than those with the other grasses at the first cutting each year, but not at second and third cuttings. Smooth brome ranked in performance between timothy and orchardgrass. Orchardgrass reduced yields for most mixtures at the first cutting the first year and all yields at the first cutting the second year. Second and third cuttings of mixtures with orchardgrass were equal to those of other mixtures, and the amount of grass in the mixtures at these cuttings was about 2 1/2 times as great as in mixtures with other grasses.

If pasture is required, ladino clover can be included in mixtures because it is better adapted than alfalfa for grazing. For hay crops, alfalfa in mixture gives the best yields. When pasture is required, orchardgrass can be used in mixtures for good grass pasture in the late summer and fall with little risk of bloat.

Seeding costs can be reduced by including the less expensive legumes in mixtures with alfalfa. In the second year the alfalfa will fill in where other legumes have died out, and yields will remain good. Where the soils in a field vary and some are not well adapted to alfalfa, other legumes that will grow on poor alfalfa soils can be used in the mixture to insure an even stand.

Hay Yields From Legume and Grass Mixtures in Various Combinations

Legume or grass mixture	Yields in tons per acre by year and cutting ^{1/}							
	1958				1959			
	1st	2nd	3rd	Total	1st	2nd	3rd	Total
Alfalfa (8 lb.) ^{2/}	1.81	1.56	1.00	4.37	2.32	1.75	1.12	5.19
Alf. (5.7) + R.C. (2.7)	2.04	1.62	.85	4.51	2.49	1.77	1.22	5.48
Alf. (5.7) + Lad. (.25)	1.74	1.51	.98	4.23	2.51	1.77	1.20	5.48
Red Clover (8 lb.)	1.64	1.21	.30	3.15	.92	.24	.41	1.58
R.C. (5.7) + Alf. (2.7)	1.81	1.61	.74	4.16	2.33	1.59	1.20	5.12
R.C. (5.7) + Lad. (.25)	1.74	1.33	.37	3.44	1.14	.37	.50	2.00
Ladino (.75)	1.21	1.32	.60	3.13	1.15	.38	.54	2.07
Lad. (.50) + Alf. (2.7)	1.57	1.53	.92	4.02	2.42	1.61	1.20	5.23
Lad. (.50) + R.C. (2.7)	1.59	1.38	.46	3.43	1.02	.40	.49	1.92
Alf. (2.7) + R.C. (2.7) + Lad. (.25)	1.85	1.61	.77	4.23	2.24	1.54	1.17	4.95
Timothy (2.7) ^{2/}	1.92	1.53	.73	4.18	2.22	1.06	.81	4.09
Tim. (1.8) + Sm.B. (2.7)	1.70	1.46	.68	3.83	2.23	1.15	.91	4.29
Tim. (1.8) + O.G. (1.3)	1.57	1.44	.70	3.72	1.59	1.02	.82	3.43
Smooth Brome (8.0)	1.76	1.45	.67	3.88	2.05	1.23	.87	4.15
Sm.B. (5.7) + Tim. (.9)	1.79	1.51	.66	3.95	2.07	1.04	.81	3.92
Sm.B. (5.7) + O.G. (1.3)	1.71	1.47	.70	3.88	1.63	1.12	.93	3.68
Orchardgrass (4.0)	1.55	1.44	.71	3.71	1.54	1.22	.98	3.74
O.G. (2.7) + Tim. (.9)	1.72	1.50	.70	3.92	1.68	1.18	.94	3.76
O.G. (2.7) + Sm.B. (2.7)	1.59	1.38	.72	3.69	1.69	1.25	1.01	3.95
Tim. (.9) + Sm.B. (2.7) + O.G. (1.3)	1.70	1.50	.72	3.91	1.85	1.16	.99	4.00

^{1/} Each yield figure summarizes yields from the legume or grass mixture combinations. There were 100 combinations, each duplicated once. Each figure is the average of yields from 20 plots.

^{2/} Figures in brackets are the pounds of legumes or grasses per acre used in the seeding mixture to give desirable proportions of legumes and grasses in the stand. Each mixture contained both legumes and grasses. Alf. = alfalfa; R.C. = red clover; Lad. = ladino; Tim. = timothy; Sm.B. = smooth brome; O.G. = orchardgrass.

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NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

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JAN 25 1961

No. 160

DO ILLINOIS SOILS NEED MOLYBDENUM?

Molybdenum is a mineral element that plants need in very small amounts. Applications of only one pound per acre have proved beneficial on deficient soils. Because such small amounts are required, very sensitive tests are needed to detect deficiencies in soils and plants. Molybdenum is almost insoluble in very strongly acid soils but becomes more soluble when lime is applied.

At present more than 40 higher plants are known to show deficiency symptoms when molybdenum is needed. In this group are vegetables, citrus fruits, and legumes. Among the common farm crops, wheat, beans, alfalfa, and clover have shown striking deficiencies on acid soils. Symptoms vary with the plants, of course, but the most common symptom is a yellowing of the leaves between the veins like that caused by manganese deficiency. In alfalfa, yellowish spots appear in the interveinal leaf tissue and enlarge to include the whole leaf. The leaves eventually die and drop off. The lower leaves are affected first; in cases of severe deficiency, the plants retain only the upper leaves.

Molybdenum is thought to be important in converting nitrate to ammonia in plants during the process of building protein. It is also important in fixing nitrogen in the soil. Alfalfa plants with nodules on the roots show an increase in protein when treated with molybdenum, while those with no root nodules show no increase. Thus, molybdenum is associated with nitrogen deficiency. But since there are several causes for nitrogen deficiency, such symptoms are not considered a reliable indicator of the need for molybdenum. Additional tests are needed to confirm the symptoms. Although a small amount of molybdenum is essential to plants, it can be toxic to plants or poisonous to animals if administered in small overdoses or if present in excessive amounts in soils.

Soils vary widely in molybdenum content. Some of the soils of Florida, California, and Oregon contain excessive amounts. Soils with acid topsoils that have formed from limy parent materials are often low in molybdenum. Acid sandy soils may also be deficient. Early in the weathering process, a large amount of molybdenum could have been lost by leaching because the topsoils were probably neutral or sweet and the molybdenum was soluble. But as time went by and the topsoils became more acid, the remaining molybdenum supply became insoluble and unavailable to plants.

Although, some soils may be deficient in molybdenum, plants growing in them may never develop symptoms if fertilizers are used. Some phosphate fertilizers contain considerable amounts of molybdenum; rock phosphate and superphosphate fertilizers from Florida have been found to contain as much as 20 parts per million, or about $\frac{4}{100}$ pound per ton. This amount, applied regularly, would probably make up the deficiency in some soils and delay the development of deficiencies in others.

At present the desirable level of molybdenum in soils is not definitely known. Some workers suggest that about 4 pounds per acre 6 inches is adequate. Studies on some of our Illinois soils indicated that they contained 1.9 to 3.32 parts per million of molybdenum and that 90 percent of it was soluble in acid-extracting solution. This amount is equivalent to 3 1/2 to 6 pounds per acre 6 inches. These results suggest that at least some of our Illinois soils contain adequate amounts of molybdenum for plant growth.

Interest in using molybdenum fertilizers has recently revived in the midwest. In tests at five locations in Indiana, soybeans showed no response in 1960. There was no increase in protein or oil content of the soybeans in trials made by the U. S. Regional Soybean Laboratory at Urbana.

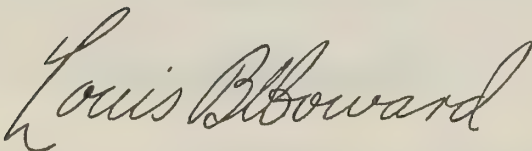
Illinois farmers treated soybeans with molybdenum last summer at 196 locations. Increases of 1/2 to 3 bushels per acre were reported at 47 locations, no increases were reported at 63 locations, and 96 of the trials were not usable, since the farmers failed to leave check strips (untreated strips) in the treated fields. Additional trials by research workers on six southern Illinois experiment fields failed to give any response except at the Carlinville field on Herrick silt loam, where a 3-bushel increase was reported.

Indications are that responses to molybdenum treatments can be obtained on some soils under some conditions, but that no widespread deficiency exists in Illinois. More specific information is needed before recommendations can be made for local situations.

Farmers in Illinois would be wise to wait until more knowledge is available about the need for molybdenum on Illinois soils before spending money and time in applying it to their soils.

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URBANA

January 20, 1961

JAN 20 1961

No. 161

FIELD TRIALS GOOD WHEN RESULTS UNDERSTOOD!

Last summer Illinois farmers conducted field trials with molybdenum on soybeans at 196 locations. Forty-seven locations showed increases in yields, 63 locations showed no response to the treatment, and 86 of the trials were not usable because the farmers failed to leave check strips in the treated fields. There was no way of knowing with certainty what had occurred on these 86 fields, which represented 44 percent of the trials. What a waste of good labor!

Modern-day farmers are faced with the problem of selecting chemicals of various kinds for use as fertilizers, insecticides, or herbicides from an ever-increasing number of products. Economic reasons determine the choice in some cases. In others, the availability of applicators may be the deciding factor. However, when new products appear, they need to be tested in the field under a variety of conditions to find out how they can best be used. Field trials in farmers' fields are an important link in the test chain for introducing new products for agricultural use. Farmers like to run their own trials to test new products before using them. A little time spent in planning the field trial may save hours of wasted labor and even some embarrassment. Here are a few pointers to help plan good field trials:

1. Contact the farm adviser for help in planning. He has access to sources of information, such as Agronomy Facts M-23 entitled "Statistics in Agriculture" and M-33 entitled "Tests of Significance for a Group of Ranked Means," that can help in planning field trials and interpreting the results. He should be willing to cooperate in the planning stages and provide reading materials when requested.
2. Keep the number of treatment variations in field trials as low as possible. Each added variation makes the trial more complex and the results more difficult to interpret. The fewer the variations, the simpler the trial will be.
3. Select areas where soils are relatively uniform. Avoid dead furrows and old farmstead sites, and keep away from hedgerows and tree-lined fencerows. When there is more than one kind of soil in a field, you may need to repeat the trial on each kind. Also, in some kinds of field trials you may need to repeat in successive years to eliminate seasonal differences.
4. Once you have selected uniform areas, you can run treatment variations in strips across the areas. When possible it is best to alternate treatments in each strip as suggested in the diagram. Leave a check strip on each side of the treatments.

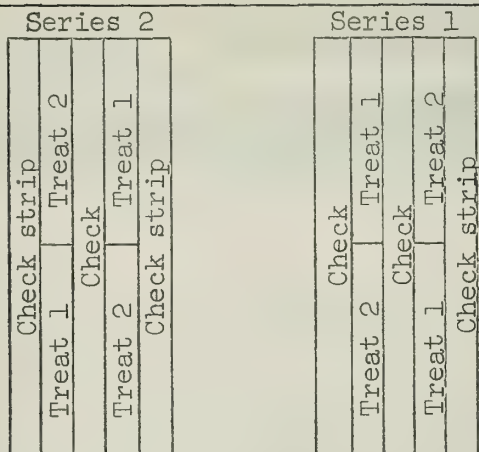


Diagram: Suggested field trial layout.

5. Duplicate the treatments in another part of the field. Use two or more series of treatments as shown in the diagram. Apply treatments carefully so that each plot will get a uniform application. Mark each test plot carefully so that it can be located again when treatments are repeated. Make a map of the field showing the location of each series of treatments. Include plenty of check plots.
6. When harvesting check plots, sample in a random fashion. Use the check on one side of the treatment and then on the other.

7. Average all results from given treatments. Compare treatments among themselves and with the average for the checks. Check plots are important because they show what the yield would have been if no treatment had been applied.

Small differences between averages may not indicate a real difference between treatments. When field trials are properly conducted, statistical analysis can be used to determine whether observed differences are real.

Farmers who propose to conduct field trials on their farms should do everything that is necessary to make sure that the results are valid and usable. They will then obtain accurate information that they can use to advantage. When the results of successful field trials are shared with others, the information can be helpful not only to individual farmers, but to the whole community.

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AGRONOMY

CROPS AND SOILS

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URBANA

January 27, 1961

No. 162

NEW IMPROVED METHOD FOR MEASURING LIME NEEDS

"Half of the fields in Illinois still need limestone in order to grow alfalfa and clover satisfactorily," report extension agronomists at the University of Illinois. They make this statement even though more than 90 million tons of limestone have been applied to Illinois soils over the years. Only by constant testing of their soil can farmers realize the greatest efficiency and most profit from their land. Until 1960, the Comber test, developed in England, was the chief method used in Illinois for measuring limestone needs of soils. This test uses thiocyanate, which gives a red color with soluble iron in soils. Since iron is more soluble in strongly acid soils than in soils that are only slightly acid, the Comber test indirectly shows the soils' need for limestone. In neutral or alkaline soils, the test solution remains colorless, and one cannot tell whether the soil is neutral (pH 6.5-7.3) or alkaline (pH 7.4 or above). Some Illinois soils are alkaline. The pH of such soils may be as high as 8.2. The Comber test does not show how alkaline these soils may be, but the pH test, which is the new method for measuring soil reaction, does. The practical significance of knowing the actual pH of the soil in the neutral or alkaline range is that a farmer can purchase fertilizers that are more available to plants in such soils. For example, different kinds and amounts of phosphate fertilizers should be used on alkaline soils than on acid soils.

Another area for error in the Comber test is in judging and distinguishing between the various shades of color of the solution. A clear solution means a neutral soil; while the darker the shade of the solution, the more lime is needed. The human error occurs when the eyes become tired and unable to distinguish differences in color between the test sample and the comparison standard. People also differ in their ability to compare colors.

The problem of finding a simple test that would pinpoint the degree of acidity was solved with the development of the pH test. In this test a mechanical instrument is inserted into a suspension of soil in distilled water. The instrument gives a reading based on a scale where 7.0 is considered neutral. A reading above 7.0 would indicate an alkaline soil and the degree of alkalinity, while a reading below 7.0 would indicate an acid soil and the degree of acidity. This new test is now being used at the University of Illinois and is being adopted by many of the soil testing laboratories throughout the state.

The table on the back shows how the Comber test compares with the pH test and the amounts of limestone needed to grow alfalfa and clover on soils that differ in acidity.

(Continued)

Comber test color	pH test ^{1/}	Tons per acre based on plowing 9 inches deep ^{3/}			
		Sandy soils	Silt loam soils	Clay loams and silty clay loams	Organic soils, muck
Clear	6.5 and above	0	0	0	0
Very slight	6.2 - 6.4 ^{2/}	1	2	2	0
Slight	5.8 - 6.1 ^{2/}	2	3	3	0
Medium	5.4 - 5.7	3	4	5	0
Strong	4.8 - 5.3	4	6	7	2
Very strong	4.2 - 4.7	5	8	-	3
	Below 4.2	-	-	-	4

- 1/ In cash-grain systems of farming without alfalfa or clover, a pH of 6.0 or above is satisfactory. Applying lime at this level may or may not be profitable. For soils below 6.0, applying 1 to 2 tons less than is shown in the table is suggested as most economical.
- 2/ Soils that have a pH of 6.2 or above without having been limed at any time are naturally high in lime in the subsoil. In this situation no limestone is suggested. For soils that are naturally in the range of pH 5.8 to 6.1, one ton less than is shown in the table is suggested.
- 3/ The amount to apply may be reduced about 10 percent for each inch less than 9 that the farmer plows.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 20, 1961

OAT VARIETIES FOR 1961

No. 163

Choosing a good crop variety is like choosing a good tool--it helps to do a better job. Selecting a good crop variety can mean the difference between success and failure of a crop. However, the choice of a well-adapted variety is only one of a number of things that are important to the success or failure of a grain crop. The advantage of good crop varieties is lost if the grower fails to use good-quality seed and enough fertilizer, or if he fails to prepare a good seedbed or control weeds. With these pointers in mind, here are some oat varieties recommended by University of Illinois agronomists for 1961:

For northern Illinois, Beedee, Clintland, Clintland 60, Garry, Goodfield, Minhafer, Newton, and Shield are the recommended varieties to plant.

Goodfield rates high on the list. It was named and released by Wisconsin in 1959. It is a little shorter than Clintland 60, but it has about the same maturity. Goodfield has very good lodging and rust resistance and is high in test weight. It yields well on highly fertile soils but is not outstanding on less fertile soils.

Minhafer was released in 1957 by the Minnesota Agricultural Experiment Station. It matures slightly earlier than Clintland 60 and about the same time as Newton. Minhafer has outstanding resistance to all prevalent stem and leaf rusts in the corn belt.

Clintland 60 was released by Indiana in 1959. It is similar to Clintland but has the advantage of being resistant to present races of crown and stem rust. It is susceptible to yellow dwarf virus. Clintland 60 is worth considering in northern Illinois.

Newton was released by the Indiana Agricultural Experiment Station in 1955. It generally has the large, plump kernel type of Nemaha and the excellent straw of Clinton. It is slightly shorter and earlier than Clinton. Newton is not so resistant to leaf and stem rust as Clintland 60, Minhafer, or Goodfield. It is susceptible to Septoria and weathers quickly if left in the field very long after ripening. It was the outstanding variety in 1959 in areas where yellow dwarf virus was present and is well worth considering in northern Illinois.

Beedee was named and released by the Wisconsin Agricultural Experiment Station in 1957. It is a mid-tall, medium-maturing variety that has better straw strength than Branch or Sauk. It is a good feeding oat with outstanding kernel quality and short, plump, wide kernels. It does not equal the other varieties in disease resistance.

Shield was released from Canada. It is a high yielder but does not equal Clintland 60, Minhafer, or Goodfield in disease resistance.

(Continued on other side)

For central Illinois, Clintland, Clintland 60, Goodfield, Minhafer, Newton, and Putnam 61 are well adapted.

The varieties specifically recommended for the central area are Minhafer, Clintland 60, and Newton. On highly fertile soils where lodging may be a problem, Goodfield is recommended.

Putnam 61 will be released by Purdue in 1961. It is the same as Putnam in maturity, plant height, lodging resistance, and yield but is superior to Putnam in disease resistance. It is like Clintland 60 in resistance to the common races of leaf and stem rust in Illinois.

For southern Illinois, Minhafer, Missouri 0-205, Newton, and Putnam 61 are the recommended varieties to plant.

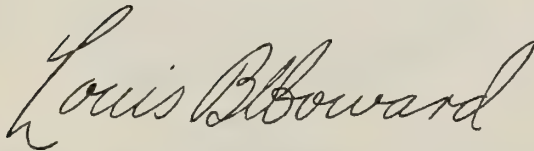
Missouri 0-205 is an early, high-yielding variety that is especially well adapted to southern Illinois. Its straw strength is not equal to that of Clintland, and it produces dark brown kernels of high test weight. Missouri 0-205 is moderately resistant to leaf and stem rust. It is considered non-acceptable for milling purposes.

Newton is the outstanding variety in areas where yellow dwarf virus is present.

Many things should be considered in deciding which variety is best for an area. Time of maturity, yield, lodging resistance, quality, and ability of the variety to produce a good crop under poor as well as favorable conditions are some important considerations. We suggest that farmers talk over variety selections with their county farm advisers.

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AGRONOMY

CROPS AND SOILS

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NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

February 24, 1961

No. 164

SOYBEAN VARIETIES FOR 1961

Here are the soybean varieties recommended by the Illinois Agricultural Experiment Station this year:

Chippewa is a very early variety in most of Illinois and has excellent lodging and shattering resistance but is rather short. It is recommended for the northern two tiers of counties in the state. One percent of the total acreage in Illinois in 1959 was Chippewa.

Lindarin was added to the recommended list in 1959 and seed should be generally available for planting this year. This variety matures about the same time as Harosoy and resists lodging much better. The leaves show a marked waviness on the outer edges. The plant is rather short, but pods are sparse near the base, helping to reduce combine loss. Lindarin has performed better than Hawkeye in Illinois, but has yielded less than Harosoy in most tests.

Harosoy matures about nine days later than Chippewa. It is recommended for the northern half of Illinois and is also widely grown in south-central Illinois preceding winter wheat. Harosoy was the leading variety grown in Illinois in 1960, being planted on 35 percent of the total state acreage.

Hawkeye matures about three days later than Harosoy. It has better lodging resistance but is lower in yield than Harosoy. Hawkeye represented 23 percent of the total Illinois acreage in 1960.

Adams matures about three days later than Hawkeye and will generally outyield Hawkeye, and in some cases Harosoy, in the central half of the state. Six percent of the total acreage in Illinois last season was planted to Adams.

Shelby is a recently released variety which was grown on 7 percent of the soybean acreage in 1960. It is three days later than Adams and higher in yield than any of the earlier varieties in central and southern Illinois.

Clark is the leading variety in southern Illinois and was planted on 22 percent of the state's acreage in 1960. It has excellent lodging resistance and yield and is about six days later than Shelby.

Kent was just released this year and will be grown by certified seed growers in 1961. It averages nine days later than Clark but has excellent lodging resistance and has outyielded Clark in most tests in southern Illinois.

(Continued)

Soybean variety trials have been conducted at eight locations in Illinois for several years. These tests furnish direct comparisons among varieties, since they are planted at the same time in the same field and cultivated and harvested in the same manner. The table below contains long-time yield averages. Under-scored varieties are recommended for 1961.

Region in Illinois:	<u>Northern</u>	<u>North Central</u>	<u>East Central</u>	<u>West Central</u>	<u>South Central</u>	<u>Southern</u>		<u>Delta</u>
Location:	Shabbona	Dwight	Urbana	Girard	wood	Eldo-	Carbon-	Miller
Years:	56-60	56-60	56-60	57-60	58-60	57-60	57-60	58-60

Variety	<u>Bushels per Acre</u>							
<u>Chippewa</u>	41.8	37.1	37.2					
<u>Blackhawk</u>	39.5	38.8	36.8					
<u>Lindarin</u>	42.2	37.8	42.0	39.1	39.6	32.0	28.6	
<u>Harosoy</u>	43.4	41.9	40.6	40.8	39.7	31.2	28.4	
<u>Hawkeye</u>	40.3	38.0	38.5	39.1	36.7	31.1	24.9	
<u>Adams</u>	42.7	43.7	41.3	39.5	35.5	34.0	26.6	
<u>Ford</u>			42.1	40.1	38.2	35.3	23.5	
<u>Shelby</u>			42.6	43.0	39.4	39.6	28.7	42.8
<u>Clark</u>			42.9	45.6	41.1	41.9	28.7	43.9
<u>Kent</u>					44.4	46.5	34.5	47.1
<u>Scott</u>					41.7	43.2	30.9	47.3
<u>Hill</u>								40.3
<u>Dorman</u>							30.1	39.5
<u>Hood</u>								37.2
<u>Ogden</u>								40.3
<u>Lee</u>								41.4

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AGRONOMY

CROPS AND SOILS

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March 6, 1961

No. 165

FIVE STEPS TO FIVE TONS

Research has revealed five important steps that can lead to five or more tons of high-quality alfalfa forage per acre.

Step 1. Meet Soil Requirements. Most alfalfa varieties are sensitive to "wet feet." But Illinois farmers are finding that, even if their soils have poor natural drainage, they can grow good alfalfa by providing adequate drainage through tiling or drainage ditches. Alfalfa does best on deep, well-drained, slightly acid to neutral soil that is well supplied with plant nutrients, especially calcium, phosphorus, and potassium. Limestone, phosphorus, and potassium should be applied according to what the soil tests show.

Step 2. Plant Certified Seed of Recommended Varieties. Agronomists suggest planting varieties that are winter-hardy. Since some varieties also last longer than others because of their wilt resistance, a farmer should decide how long the stand will be needed. In Illinois, Alfa, DuPuits, Atlantic, Buffalo, Ranger, and Vernal are recommended for pasture or hay for one or two years. Buffalo, Ranger, and Vernal are also recommended for longer stands. Since Buffalo is less winter-hardy than the other two, it is not recommended for the northern one-third of Illinois.

Avoid using untested, newly developed varieties until they are thoroughly tested. Plant certified seed to be certain that the plants will produce the amount and quality of forage you expect. Certified seed can be easily identified by a blue tag on each bag or other seed container. Your farm adviser or agricultural college has a free publication, "Certified Alfalfa--the Profit Factor in Livestock Farming," that will help you select the best variety for your farm.

Step 3. Get the Proper Start. Plant the seed--don't bury it! Alfalfa seeds are small. If they are planted more than 1/2 inch deep, they may not come up. You can broadcast the seed on the surface and cover it with a corrugated roller. Or you can band-seed it over a phosphorus fertilizer. Band-seeding attachments for grain drills have been used for several years. When seeding in the spring, use oats as a companion or nurse crop. For late summer seedings, do not use a companion crop.

Step 4. Manage Established Stands Carefully. For top yields, agronomists recommend three cuttings a year in Illinois. The first cutting can be made any time after June 1 in central Illinois or when the crop is at the 1/10 bloom stage. The second cutting should come midway between the first cutting and the last safe cutting date or at the 1/10 bloom stage, whichever is first. The third cutting should be on or before the last safe cutting date or 1/10 bloom stage whichever is first.

Cutting alfalfa during the month before growth ceases in the fall depletes the stored food supply for winter and reduces vigor the following year. In northern Illinois the last safe cutting date is September 1. In central and southern Illinois, it is September 7 to 14.

Step 5. Harvest and Store Properly. To get top-quality forage, you must harvest and store it carefully. When you plan to cure the hay in the field, check the weather forecast before cutting. Crushers and crimpers are sometimes helpful in getting the hay into the barn before it rains. Driers may also be useful where rain is common during the cutting season. To preserve quality, it is vital to reduce unfavorable weather effects. Haylage, silage, wafers, pellets, or compact bales are the preferred storage methods.

More about producing higher yields of top-quality forage will be featured in the Agronomy Exhibit at the University of Illinois Farm and Home Festival April 6-8 at Urbana. Each of the five steps will be illustrated. High-quality alfalfa forage becomes high-quality dairy products and tasty beefsteak. Sample cubes of broiled haylage beefsteak will be served from 9:30 to 11:30 in the morning and from 1:30 to 4:00 in the afternoon each day of the festival and from 6:30 to 8:30 on Thursday evening at the exhibit in the Canvas Arena. Crop and soil scientists will be on hand to answer your questions. If you bring a soil sample from the field where you plan to seed alfalfa this year, you can get a free acidity test at the exhibit.

Young people who are planning to attend college should visit the "Opportunities in Agronomy" exhibit in the Canvas Arena. Agronomy students and staff will be there to discuss futures in crops and soil sciences.

Watch for more information on each of the five steps in following issues of Agronomy News.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 27, 1961

No. 166

USING NITROGEN WISELY THIS SPRING

Illinois farmers used almost seven times as much nitrogen fertilizer in 1960 as they did in 1950. Nitrogen is now plentiful and is available as a gas, in solutions, in liquid mixed fertilizers, and in several dry forms. It can be used on several different crops and applied at widely different times.

Wise use of nitrogen is an important key to profitable crop production. Here are a few important tips to consider this year in using nitrogen for corn:

Soil Type Should Guide Application Time. On medium-textured Illinois soils, nitrogen can be applied for corn with equal advantage in the fall, in early spring, near planting time, or as a side dressing.

On coarse-textured sandy soils, nitrogen may wash away if it is applied early. On such soils it is best to apply the material as a side dressing or at planting time. Though specific research is lacking, it is also possible that losses may occur on poorly drained soils when nitrogen is applied in the fall or early spring.

Research shows no consistent advantage for any particular time of application or form of nitrogen. Illinois agronomists have tested calcium nitrate, ammonium sulfate, and urea in winter, spring, and side-dressing applications. We might expect side dressing to be superior to the others because the nitrogen is applied nearest to the time when the corn needs extra amounts for rapid growth. If no rain falls during this period, however, the side-dressed nitrogen is in dry soil near the surface and the crop may use it less efficiently than nitrogen applied earlier.

No Form Has Advantage. All forms of nitrogen on the market work about equally well on corn. Although research at one location in one year often shows an advantage for one form, there is at present little reason to prefer one form of nitrogen over another from a yield standpoint. You can choose the form on the basis of the lowest cost per pound of nitrogen, the equipment available for handling it, convenience, and the extra services that different suppliers can provide.

How Much to Apply? As the farmer who knows your farm best, you must decide the specific amount of nitrogen you feel will be most profitable. You will know whether the soil is low or high in organic matter, whether manure has been used, and how long it has been since a good alfalfa or clover sod was turned under on that field. Here are some general guides you can use to fit specific fields:

Situation

Nitrogen to Apply

- | | |
|---|----------------------------|
| • First-year corn following a good legume | 0 to 50 pounds per acre |
| • Second-year corn in above situation | 60 to 100 pounds per acre |
| • Corn following soybeans | 60 to 100 pounds per acre |
| • Continuous corn | 100 to 150 pounds per acre |

We have given a range of rates for each situation. The heavier rate may be profitable if (1) the soil is capable of producing high yields--from 100 to 150 bushels an acre; (2) the field has been heavily cropped, with few legumes, or little manure has been applied; (3) the population will be 16,000 plants or more; and (4) good corn-growing practices will be followed in every respect.

The most profitable amount of nitrogen to apply is determined to a considerable degree by individual experience. We suggest leaving four rows without nitrogen and doubling the usual rate on another four rows and then measuring the yields from rows with no treatment as well as those with different nitrogen treatments. Within a few years you should have valuable experience to guide you in determining profitable rates to apply.

Nitrogen in Starter Fertilizer. Applying a small amount of nitrogen with phosphorus in the row at planting time increases the amount of phosphorus that the young plants absorb. This practice favors rapid early growth and will prove beneficial if it permits you to cultivate early to control weeds. This starter effect can be produced by applying 10 to 15 pounds of nitrogen per acre, provided the basic nitrogen need is met in some other way.

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AGRONOMY

CROPS AND SOILS

DEPARTMENT OF AGRICULTURE
NEWS

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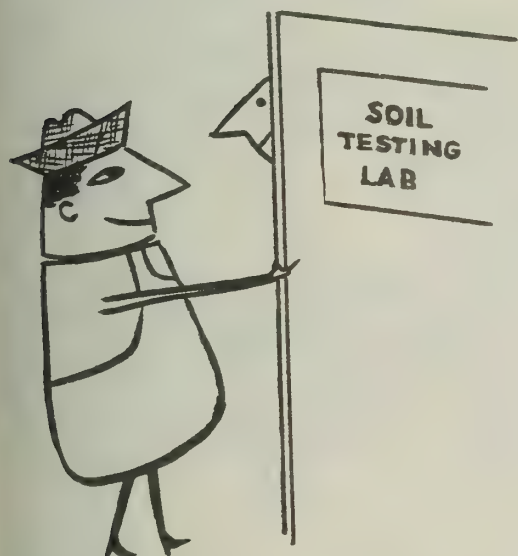
URBANA

March 28, 1961

No. 167

FIVE STEPS TO FIVE TONS

Step 1. Meet Soil Requirements



Alfalfa thrives best on deep, permeable, well-drained, non-acid soils with a good supply of phosphorus and potassium. Soil tests show the amounts of plant nutrients that are available in the soil, and deficiencies can be easily remedied with fertilizer applications. However, some physical properties of soils are difficult to alter and may be important in determining alfalfa yields.

Alfalfa can be established on almost all Illinois soils except the strongly acid or very poorly drained ones. However, some soils provide a better root environment than others. Among the best suited dark-colored prairie soils are Saybrook, Lisbon, Proctor, Brenton, Catlin, Flanagan, Port Byron, Joy, Tama, Muscatine, Bolivia, and Ipava. Drummer, Sable, and Illiopolis have poor natural

drainage, but can produce high yields if they are adequately drained with tile. Miami, Camden, Starks, Birkbeck, Reeseville, Fayette, Rozetta, Stronghurst, Clary, Clinton, Keomah, and Alford are among the light-colored soils that best meet requirements.

Some Illinois soils contain relatively large amounts of clay in the subsoils. They are slowly to very slowly permeable to water and plant roots. Such soils are undesirable for growing alfalfa because the roots are heaved out of the soil during the freezing and thawing period in the spring. Soils in southwest and south-central Illinois, including Herrick, Virden, Cowden, Cisne, Hoyleton, Blueford, and Wynoose, are in this group. On these soils alfalfa may yield well for one or two years, but the stand can seldom be maintained into the third or fourth year. Circular 756, "Alfalfa," gives more information about the soils in Illinois that are best suited for alfalfa. Get a copy from your farm adviser.

When alfalfa stands are three years old or older, an inadequate supply of potassium may limit yields. As a possible remedy, topdressing with a potassium fertilizer after the first cutting is suggested on a trial basis.

Normally the bacteria living in nodules on the roots of alfalfa fix nitrogen from the air in forms the plants can use. Thus the plant provides for its own nitrogen needs. The bacteria for alfalfa plants are frequently present in the soil, but it is good insurance to plant inoculated seed. Use of inoculated seed is especially important on land where alfalfa is seeded for the first time. Inoculum can be applied fresh on the seed just before seeding, or pre-inoculated

seed can be bought. If pre-inoculated seed is used, you should have some guarantee or assurance that the bacteria on the seed are still alive in sufficient numbers for effective nodulation.

To give new alfalfa seedings a good start, seed the companion small grain crop thinly (not more than one bushel of oats or 1 1/2 bushels of wheat per acre). Unless nitrogen is expected to be low, do not use it with the nurse crop. If you do apply nitrogen, use only small amounts to avoid heavy growth that may lodge and smother the new seeding.

Alfalfa grows best on slightly acid to neutral soils and can even be grown successfully on alkaline soils. Acid soils should be limed to pH 6.2-6.5.

Illinois soils are seldom deficient in minor elements, but boron deficiency often develops in local areas during drouth periods. The affected alfalfa plants appear yellow and stunted. Boron is needed by the new tissue at the stem tips. When this element is lacking, the growing tips fail to elongate, giving them a rosetted appearance. An application of 25 to 35 pounds of borax per acre is usually adequate to make up the deficiency. It is best to apply the borax on trial strips before treating the entire field.

A REMINDER -- Don't forget the University of Illinois Farm and Home Festival on April 6-8. The general theme is "Foundations for the Future." At the Festival the agronomy exhibit will feature "Five Steps to Five Tons of High-Quality Alfalfa Hay." In conjunction with Step 1, Meet Soil Requirements, you are encouraged to bring a soil sample from a field where you plan to seed alfalfa at some future time in your rotation, or a field that is already in alfalfa, and get a free acidity test at the exhibit.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 29, 1961

No. 168

FIVE STEPS TO FIVE TONS

Step 2. Plant Certified Seed of Recommended Varieties

Certified seed assures varietal purity and identity. Look for the "certified tag" on every container of alfalfa seed that you buy. By using certified seed of the varieties recommended for Illinois, you can be sure that the variety you plant is adapted to the state and will perform as expected. Improved varieties that are recommended by the Illinois Agricultural Experiment Station are Alfa, Atlantic, Buffalo, DuPuits, Ranger, and Vernal.



Winter-hardiness and wilt resistance are two important characteristics to consider in deciding what variety to plant. Winter-hardiness and wilt resistance lessen the risk of losing valuable long-term legume stands. The need for winter-

hardiness is obvious. If you need hay or pasture for more than two years, use one of the wilt-resistant varieties, Buffalo, Ranger, or Vernal. For short-term stands, wilt is usually not important; therefore either wilt-resistant or susceptible varieties can be used.

Alfa is the newest variety to be added to the list recommended for Illinois. Alfa starts growth early in the spring, recovers rapidly after cutting, and grows late into the fall. It establishes itself quickly, is high yielding, and is sufficiently winter-hardy for Illinois. But it should be used only in short-term stands (two years or less) because it is susceptible to bacterial wilt.

Atlantic was developed by the New Jersey Agricultural Experiment Station. Although not wilt-resistant, it is a good producer and is excellent for short-term stands. The foliage is dark green and the flowers are predominantly light purple.

Buffalo is a rapid-growing, high-yielding, purple-flowered variety developed from wilt-resistant selections of Kansas Common. It is especially recommended for southern Illinois because it often outyields Ranger and Vernal in this area. It is not sufficiently winter-hardy for extreme northern Illinois. It can be used in either long- or short-term stands.

DuPuits starts early in the spring, recovers rapidly after each cutting, and grows late into the fall. It can be expected to bloom about one week earlier than many other varieties, and it should be cut accordingly. It is moderately resistant to certain foliage diseases, but is susceptible to bacterial wilt. It can be used throughout the state in short-term stands.

Ranger, developed jointly by the Nebraska Agricultural Experiment Station and the U.S.D.A., is popular throughout the state. It is winter-hardy and wilt resistant, but in some years it is damaged more by leaf diseases than some other varieties. It is recommended for both long- and short-term stands.

Vernal is a winter-hardy variety that is highly resistant to bacterial wilt. It was developed by the Wisconsin Agricultural Experiment Station and the U.S.D.A. It is easily identified by its many-colored flowers and broad, deep-set crowns. An outstanding characteristic is its ability to maintain high forage yields under a wide range of management conditions. It is used in Illinois for long- or short-term hay or pasture stands.

Common alfalfas are regional strains that evolved from natural selection in states west of the Mississippi River. Their characteristics are not sufficiently distinct to consider them as separate varieties. These strains are identified by state of origin--for example, Arizona, Oklahoma, Utah, and Kansas Common. They vary in winter-hardiness and are susceptible to bacterial wilt.

Several new varieties and strains are presently being tested in Illinois. Some look promising, but until more information is available Illinois farmers should continue to use recommended varieties.

Each year the University of Illinois College of Agriculture publishes a leaflet containing up-to-date information on varieties and management for successful alfalfa production. You can get a copy from the farm adviser, the Department of Agronomy, and seed dealers. Consult your farm adviser for suggestions on varieties and management of your alfalfa crop.

A REMINDER -- Don't forget the University of Illinois Farm and Home Festival on April 6-8. The general theme is "Foundations for the Future." At the Festival the agronomy exhibit will feature "Five Steps to Five Tons of High-Quality Alfalfa Hay." Sample cubes of haylage beefsteak will be served.

* * * * *

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CROPS AND SOILS

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March 30, 1961

No. 169

FIVE STEPS TO FIVE TONS

Step 3. Get a Good Start



Once you have obtained good seed it is essential to provide the best possible environment to insure good germination and get the new seedlings off to a healthy start.

The seedbed should be relatively smooth and firm to insure contact between the seed and the soil. Loose, overworked seedbeds allow the soil to dry out, especially near the surface where the seed is placed. Such soils may also crust badly after rains, and the young seedlings may not be able to reach the surface.

The seed should be inoculated before planting to insure the young plants a good nitrogen supply. The bacteria from the inoculant cause nodules to form on the roots. The bacteria in these nodules convert nitrogen from the soil air into a usable form for the plants. Inoculated alfalfa can add 100 to 125 pounds of nitrogen to the soil per acre each year.

Alfalfa can be seeded in the spring anywhere in Illinois. In northern Illinois, spring seedings with oats as the companion crop are more dependable than late summer seedings. There may not be sufficient fall growth of late summer seedings to allow the plants to live through the winter. Alfalfa may be seeded without a companion crop in the spring in central Illinois. In south-central and southern Illinois, hot weather in July and August is likely to damage spring seedings, and late summer seedings without a companion crop are more dependable as a rule.

Plant the seed. Don't bury it. Alfalfa seeds are small and should be planted near the surface not more than one-half inch deep. They can be band-seeded when a companion crop is not used. If a companion crop is used, the seed can be broadcast and covered with a corrugated roller. If the soil is too wet in the spring for machinery, the seed can be broadcast with a windmill-type seeder. Spring plantings of alfalfa in fall-seeded grain crops can be broadcast early when the soil is freezing at night and thawing during the day.

Plant 10 to 12 pounds of seed per acre. Some experienced growers use lower rates when the soil is especially productive. Plant the companion crop thinly enough to avoid smothering the new alfalfa seeding.

Alfalfa seedings often include grasses and other legumes. The amounts and types of grasses or other legumes to use in mixtures depends on the location in the state, soil conditions, the length of time the stand will be needed, and the intended use. Sometimes seeding costs can be reduced by substituting another less expensive legume for part of the alfalfa. Recent results from experiment fields indicate that alfalfa will fill in the stand the second year.

Remove the companion crop as early as possible. Early harvesting as pasture or a silage crop removes competition for sunlight, plant nutrients, and moisture at a critical period and helps to promote a vigorous stand of forage. If the companion crop is harvested for grain, clipping the stubble and removing the straw favors growth of the alfalfa. Clipping helps to control weeds.

Do not clip or pasture new stands (two years or more) for about 30 days before growth ceases in the fall. This delay will allow the plants to store food for winter and vigorous growth the following spring.

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NEWS

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URBANA

March 31, 1961

No. 170

FIVE STEPS TO FIVE TONS

Step 4. Carefully Manage Established Stands

With careful management, alfalfa either in pure stands or in mixtures will produce dependably high yields of top-quality forage. But careful management of established stands is essential in order to get five or more tons of high-quality forage per acre. Illinois agronomists have found that one of the important factors in getting high yields and high quality is a careful cutting schedule. A study of seven different cutting schedules over a four-year period in DeKalb County in northern Illinois and on the Agronomy South Farm at Urbana showed the following yields in tons per acre:



Cutting Schedule^{1/}

DeKalb

Urbana

	1957	1958	1959	1958	1959	1960
4 cuttings per year	4.27	5.12	3.78	4.89	3.70	3.99
3 cuttings 1/10 bloom	5.27	5.66	5.12	5.29	5.50	4.20
3 cuttings ^{2/} , spring clip	3.98	5.07	5.18	5.08	4.62	4.28
3 cuttings ^{2/} , spring clip, fall clip	4.44	4.69	3.78	5.49	4.65	3.70
3 cuttings ^{2/}	4.73	6.02	5.35	5.54	5.32	4.15
3 cuttings; fall clip	5.34	5.82	3.19	5.81	5.64	3.45
2 cuttings	3.16	4.43	5.57	4.03	4.15	4.31

^{1/} In the third year the same three-cut schedule was used in all trials. Differences in yield are due to management the first and second years.

^{2/} Cuttings at 1/2-bloom stage.

These results show that:

1. Three cuttings yielded almost a ton more per acre per year than four cuttings. The yield increase from three cuttings was mostly stems rather than leaves.
2. The extra (fourth) cutting reduced plant vigor the following year.
3. Two cuttings per year reduced yields in some years. The forage was also lower in quality.
4. Spring clipping reduced yields without loss in plant vigor in subsequent years under a normal system, while fall clipping reduced both yield and growth vigor.

5. Three cuttings per year produced consistently high yields of excellent quality hay, but there was loss in quality when cutting was delayed until the half-bloom stage.

Illinois agronomists recommend the following cutting schedule: Make the first cutting at the 1/10-bloom stage. In central Illinois this is about June 1. Make the second cutting midway between the first cutting and the last safe cutting date in the fall or at the 1/10-bloom stage, whichever comes first. Make the third cutting on or before the last safe cutting date, which is September 1 in northern Illinois and September 7-14 in central and southern Illinois. For pasture, moderate grazing is permissible as soon as the alfalfa is 14 inches tall.

The best way to control disease is to use resistant varieties. Buffalo, Ranger, and Vernal are resistant to bacterial wilt and therefore are recommended for long-term stands in Illinois. Alfa, Atlantic, and DuPuits are very productive but are susceptible to bacterial wilt; therefore they should be used only in short-term stands. Talk with your farm adviser before deciding which variety to plant.

* * * * *

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 3, 1961

No. 171

FIVE STEPS TO FIVE TONS

Step 5. Harvest and Store Properly to Preserve Quality



In general, the method of harvesting is based on the type of storage and on the feeding procedure. Forage may be stored as dry hay, haylage, or silage. It may also be chopped green and hauled to the cattle-feeding area. In this case, storage facilities are not necessary.

Dry hay is most frequently handled with a pickup baler, but occasionally a field chopper may be used. In the future, field pelleting and wafering machines may become basic harvesting tools in the less humid areas. The greatest limitation in humid regions is getting the hay dry enough for safe storage. Hay that is dried and cured in the field can be considered safe for storage in the mow if it contains no more than 15 percent moisture for chopped hay, 20 percent moisture for loose hay, and 25 percent moisture for baled hay. You can judge the moisture content of the hay by twisting a handful and examining the stems. Hay that is dry (below 25 percent moisture) shows no visible sign of mois-

ture on the twisted stems. Chopped hay should never be "tramped" in the mow, and hay bales should be stacked to allow air to circulate.

Haylage is forage that is dried to 40-60 percent moisture (too dry for silage and too wet for dry storage) and is usually stored in an oxygen-free system. It is cut, allowed to wilt, chopped, and stored all on the same day. This process preserves forage quality and makes it necessary to handle less water than with silage. Although good drying weather is needed to reduce the water content of the forage below 60 percent, losses due to weathering are greatly reduced. Leaf losses are also minimized. Haylage is usually made by cutting and allowing the forage to wilt. It is then chopped and stored. A crimper or crusher may be used to hasten wilting.

Hay-crop silage may be cut, chopped, and stored in a silo immediately, or after cutting it may be allowed to wilt in the field until the moisture content is reduced to below 70 percent. Then it may be chopped and stored in the silo.

If the moisture content is high, adding a preservative, such as molasses, ground ear corn, or cracked, shelled corn, reduces the moisture percentage, promotes a desirable type of fermentation, and increases the total digestible nutrients (TDN).

If the moisture content is lower than 70 percent, it is not necessary to add a preservative. For high-quality silage the moisture content should never fall below 60 to 65 percent. Harvesting forage as hay-crop silage eliminates the losses in forage quality from weathering, as there is no need for long periods of good drying weather. Trench, bunker type, or upright silos may be used for storage, but they need to be kept in good condition to preserve forage quality. The necessary harvesting machinery can be used for either silage or haylage.

Supplemental forage harvesting machines are available that aid in the drying process. Crimpers and crushers can reduce drying time by 30 to 50 percent when they are properly operated and when natural drying conditions are favorable. However, they are of little use during prolonged periods of rainy weather. Under these conditions, natural forced air or heated forced air mow dryers can be used to help dry baled, chopped, or long hay. Portable batch dryers are also on the market.

Looking to the future, we shall undoubtedly see a shift from dry hay storage to haylage or silage-type storage. Relatively new, large, high-capacity field machines make the possibilities of high-moisture storage even more attractive. For example, self-propelled windrowers that take a 12-foot swath and place the forage in a uniform windrow and high-capacity, trailed field choppers are in operation. They shorten harvesting time greatly.

Proper harvesting and storage of forages will be emphasized at the Farm and Home Festival on April 6, 7, and 8.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 4, 1961

No. 172

OPPORTUNITIES IN AGRONOMY

Do you want to farm some of the finest soil in the world?
Would you like to probe the inner secrets of plant growth?
Or would you prefer the challenge of a more applied problem, such as helping farmers decide which is the best cropping system and whether to use anhydrous ammonia or ammonium nitrate?
Does a career in technical service relating to sales of fertilizers and weed killers appeal to you?
Would you like to explore ways to conserve moisture and eliminate drought in the corn belt?

These and many other opportunities await those who prepare for careers in agronomy.

Agronomists work with soils and crops. Nearly all life depends ultimately on soils. It is the agronomists' responsibility to learn to understand soils; to classify them; to fertilize, lime, and till them for maximum profit; to develop better crops and to grow them in better ways.

Agronomists have the major responsibility for applying the principles of many basic sciences to the practical problems of plant growth and soil management. Some agronomists are trained as pure chemists; others have strong training in physics and mathematics; some are plant physiologists, geneticists, or microbiologists. An agronomist played a major role in the development of streptomycin.

In addition to the common farm tools used in field experiments, the tools of the trade of agronomists are many and varied. Agronomists use radioactive tracers to study plant nutrition and the movement of weed-killing chemicals within plants. They use X-rays to study the crystal structure of clays. Agronomists peer through microscopes aimed at the inside of plant cells, searching for the secrets of plant inheritance and for the way in which certain chemicals kill plants.

Trained agronomists may thus choose their life work from many different fields that relate to soils and crops. But there is still further choice of opportunities in agronomy. The work they choose may range from the highly applied (farming) to the highly abstract (basic research). Between these extremes are the college and high school teaching, the extension service, and soil conservation work. Fertilizer companies and manufacturers of weed chemicals conduct research, sales, and technical services that employ agronomists. Large seed companies are looking for plant breeders and other men trained in agronomy to direct their production programs.

Agronomists hold many important administrative positions. Some of them are deans and directors of research and extension in land-grant colleges. Some are doing technical work with the Ford and Rockefeller Foundations in Asia and South and Latin America.

A three-year survey of the occupations of agronomy graduates of agricultural colleges in the United States from 1957 to 1959 showed them engaged in the following occupations:

<u>Occupation</u>	<u>Percent</u>
1. Agricultural business	19
2. Work toward advanced degrees	19
3. Agricultural conservation	15
4. Military service	13
5. Farming	12
6. Agricultural education	5
7. Research	4
8. Miscellaneous	13

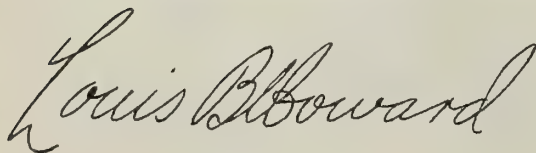
About one-eighth of the graduates of agricultural colleges are full-time farmers. Most of the others go into fields that relate to agriculture. Those who go into military service distribute themselves in various branches of agriculture later. Only the 13 percent classed as miscellaneous are working outside agriculture. Students who choose to major in agronomy can therefore be sure of finding an occupation in this field that will suit their particular interest.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS ~~REC'D~~ URBANA

April 10, 1961

APR 11 1961 No. 173

PRE-EMERGENCE HERBICIDES FOR 1961

Pre-emergence herbicides are weed-killing chemicals that are applied before the crop or weeds emerge. They are recommended primarily for serious weed problems that cannot be handled by ordinary cultural practices and post-emergence applications of 2,4-D. Because of their costs, pre-emergence herbicides are usually applied over the row in a 12- to 14-inch band at planting time with equipment mounted on the planter.

The following table lists chemicals recommended for 1961 and amounts to apply:

Crop	Pre-emergence herbicide	Amount to apply per acre in 12- to 14-inch band		Weeds controlled
		Liquid ^{1/}	Granular	
Corn	Randox	1 1/3 qt.	7 lb. (20% a.i.) ^{4/}	Annual grasses
	Atrazine	5/6 to 1 1/4 lb.	3 1/3 to 5 lb. (20% a.i.)	Annual grasses and broadleaves
	Randox-T (trial use)	1 1/2 qt.	10 lb. (35% a.i.)	Annual grasses and broadleaves
	2,4-D ester ^{2/}	1/2 lb. ^{3/}	3 1/3 lb. (20% a.i.)	Annual grasses and broadleaves
	Eptam ^{2/}	2/3 qt.	20 lb. (5% a.i.)	Johnsongrass and wild cane from seed
Soybeans	Randox	1 1/3 qt.	7 lb. (20% a.i.)	Annual grasses
	Alanap ^{2/}	2/3 gal.	14 lb. (10% a.i.)	Annual grasses and broadleaves except smartweed
	Amiben (for seed beans only)	2 qt.	10 lb. (10% a.i.)	Annual grasses and broadleaves

^{1/} For band spraying, use the indicated amount of herbicide in 7 to 10 gallons of water per acre.

^{2/} These materials sometimes cause crop injury. See discussion.

^{3/} Actual amount of active ingredient (2,4-D acid).

^{4/} a.i. stands for active ingredient. The amount listed is for material with the indicated percent of active ingredient.

Randox is recommended for control of annual grasses in both corn and soybeans. For successful control, about half an inch of rain is needed within a week or 10 days after treatment. Because Randox is irritating to the skin and eyes, wear rubber gloves and goggles when using it. Do not use on sandy soils.

Randex-T is Randex with an additive. It controls most annual broadleaved weeds, as well as the annual grasses. It should be used only on corn. Wear rubber gloves and goggles to help prevent irritation to your skin and eyes. Do not use on sandy soils. Because a few cases of damage were reported last year, we recommend Randex-T only for trial use in 1961.

Atrazine controls annual grass and broadleaved weeds if sufficient rain falls during the 10 days after application. The wettable powder, which is mixed with water and applied as a spray, is recommended over the granular material for 1961. Adjust your application rate according to your type of soil. The lower rate shown in the table will be satisfactory for soils lower in organic matter and more coarse textured. Use the higher rates for soils higher in organic matter and finer textured.

We do not recommend seeding winter grain in the fall after you apply Atrazine in the spring. Simazine is similar to Atrazine but is less soluble. So Simazine is preferred for sandy soils.

2,4-D ester (not amine) may be used pre-emergence on corn. If rain falls soon after treatment, 2,4-D gives fairly good control of annual grasses and does a good job on broadleaved weeds. Stands may be reduced slightly, particularly if corn is planted less than three inches deep. Do not use on sandy soils. Do not use if nearby sensitive crops have already emerged from the soil.

Eptam is not recommended for control of weeds in corn except in areas where Johnsongrass and wild cane seedlings are expected. It should be incorporated into the top inch of soil. This compound sometimes injures corn, but this injury is usually insignificant compared with the damage caused by Johnsongrass and wild cane.

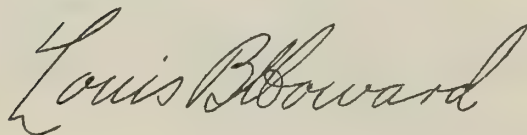
Alanap may be used when broadleaved weeds (except smartweeds) are likely to be serious in soybeans. Soybeans are occasionally injured by this compound, particularly if rainfall is heavy. Do not use on sandy soils.

Amiben has been cleared for use only on beans that are being grown for seed and that will not be used for processing into food or feed. Field results in 1959 and 1960 indicated good control of both broadleaved weeds and grasses, with little or no damage to soybeans.

When using herbicides, be sure to read and follow the manufacturer's instructions. Use the necessary safety precautions. Calibrate your applicator accurately, and apply the recommended amounts. Make applications only at the recommended times and only to control weeds in the crops for which the herbicides are recommended.

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AGRONOMY

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NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 17, 1961

APR 25 1961
No. 174

PRE-EMERGENCE HERBICIDES--GRANULAR OR LIQUID

U. of I. Record

Pre-emergence herbicides will be widely available in both liquid and granular forms in 1961. Farmers planning to make pre-emergence applications need to decide which form to use. Here are some pointers that can help them decide whether to use the liquid or granular form in 1961.

Most granular pre-emergence herbicides are made by impregnating or soaking inert clay granules with the weed-killing chemical. The clay is the carrier for the chemical. In the case of one product, ammonium sulfate is used as the carrier instead of clay. Granules release the herbicide when they are moistened in the soil. Granular forms are unsuitable for post-emergence foliage treatments, but liquid preparations may be used both before or after plants emerge from the soil. Research to date indicates that in general the granular forms are about equal to the liquid in effectiveness if applied accurately and uniformly to the soil at recommended rates.

Granular herbicides can be obtained in bags or drums. If the fertilizer and seed are handled in bags, the farmer may prefer to have the herbicide in bags also. Hauling large amounts of water and using sprayers is not required with granular herbicides. They drift less with the wind and may be less irritating to the skin and eyes than liquids.

On the other hand, granular herbicides require more storage space and more handling than sprays. Because of formulation, shipping, and storage requirements, granular herbicides are more expensive than the liquid forms per pound of active ingredient. This year granular materials will cost about 60 cents an acre (band application) more than liquids.

Manufacturers of granules have experienced some formulation problems. Granular sizes and concentrations for different products need to be standardized. Much of the equipment for applying granules is relatively new and problems have been encountered in obtaining accurate and uniform applications of some herbicide preparations.

Well designed machines are needed to apply as little as $3 \frac{1}{3}$ pounds of granules per acre (less than $\frac{1}{2}$ oz. on 100 feet of row in a 14" band) and such machines need to be reasonably priced.

On the other hand spray equipment has been fairly well perfected and most farmers are experienced in its use. A sprayer is usually calibrated by checking the output of one nozzle but granular equipment on a four-row planter has either 2 or 4 applicators that need to be calibrated.

(Continued)

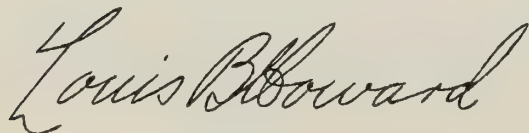
Some of the problems associated with granules have been worked out and additional improvements in materials and equipment are expected. However, a farmer who has a sprayer for applying pre-emergence herbicides and is satisfied with it, should continue to use it.

A farmer with a granular applicator who is sure that he can make an accurate and uniform application is justified in continued use of granules.

The farmer who has neither kind of equipment should consider the above advantages and disadvantages in each method before making his decision and then select well designed equipment.

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A handwritten signature in cursive script, reading "Louis Blouard". The signature is written in dark ink and is positioned above the printed name and title.

Director

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URBANA

April 24, 1961

No. 175

CORN PLANTING RATES HELP DETERMINE CORN YIELD

Research by agronomists in Illinois and other states has shown that the plant population helps to determine corn yields. Yields tend to be lower when stands are either above or below the optimum. Farmers need to adjust their planting rates to get the optimum stand for the highest yield in each field they plant. Here are a few tips to help select the best planting rate:

Soil productivity helps determine yield.

The ability of the soil to supply water and plant nutrients to the growing corn plants helps determine its production potential. Farmers who know what yield to expect from a field can adjust their planting rates accordingly. Yield estimates for many Illinois soils are available from your farm adviser or from agronomists at the University of Illinois. The table below shows how fertilizer corn yields vary with plant population and three levels of nitrogen. The results are averages from nine hybrids on the Agronomy South Farm at Urbana.

Plant population	Nitrogen level		
	Low	Medium	High
8	70	80	90
12	75	90	107
16	62	92	116
20	58	90	118
24	47	75	103

Use care in selecting varieties to plant.

In thick stands, the plants compete for sunlight, soil moisture, and plant nutrients. Stalks are usually smaller and there are more broken stalks and barren plants in thick plantings. The ears also tend to be smaller as population increases. The point is finally reached where ear size decreases enough to offset any increase in yield from the larger number of ears. Harvesting losses may also be greater with smaller ears.

Under competitive conditions some hybrid varieties use light, moisture, and plant nutrients more efficiently than others. Such varieties should be selected for thick plantings on productive soils. Growers who wish to plant at rates above 18,000 to 20,000 plants per acre should consult their seedsman about the best adapted hybrids.

Select the planting rate that best fits your needs.

Since the factors that determine the optimum plant population vary from field to field, farmers should adjust their planting rates to get the optimum stand for

(Continued)

each set of field conditions. The normal planting rate for Illinois is 12,000 to 16,000 plants per acre, depending on yield possibilities. With some hybrid varieties that do well in thick plantings, 18,000 plants per acre or more may give the best yields on the most productive soils. The following table will serve as a rule in selecting the population that is adequate for the expected yield:

Yield expected (bu./acre)	Stand required (plants/acre)
50	4,000
75	8,000
100	12,000
125	16,000
150	18,000

Plant to get even stands.

Corn may be checked, hill-dropped, or drilled with little difference in yield, although weeds may be easiest to control in checked corn unless chemical control of weeds is practiced. Missing plants reduce yields, and the loss is never entirely overcome by increased growth of the surrounding plants. Planters should be carefully adjusted and in good repair to insure even planting.

Adjust planting speed for good stands.

Research has shown that high-speed planting reduces stands. The following table from Ohio shows how planter efficiency changes with planting speed. When planting at three miles per hour, farmers should adjust their planters to drop about 10 percent more seeds than they need in order to get the desired stand.

Planter speed miles per hour	Kernels dropped at planter setting			
	15,000	Percent	20,000	Percent
1	14,700	98	19,400	97
3	13,650	91	16,800	84
5	11,850	79	15,800	72
7	10,050	67	11,600	58

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UNIVERSITY OF ILLINOIS

URBANA

May 4, 1961

No. 176

ABOVE-NORMAL RAINFALL IN APRIL HELPS TO OVERCOME SUBSOIL MOISTURE DEFICIENCY

Early April sampling by soil scientists of the Agricultural Research Service and Soil Conservation Service at 21 locations throughout Illinois indicated that many soils were only 70-80 percent recharged with moisture for the 1961 growing season. Although March rainfall was above normal for most of Illinois, it was not sufficient to overcome below-normal subsoil recharge since the 1960 growing season. The table below shows the amount of moisture found in the soils compared with their storage capacity.

County	Soil type	Soil moisture supply (inches/acre)						Per- cent re- charge
		Surface 0-24 inches		Subsoil 24-51 inches		Total soil 0-51 inches		
		Capacity	Found	Capacity	Found	Capacity	Found	
DeKalb	Saybrook sil	3.2	4.4	5.6	5.5	8.8	9.9	100
Fulton	Clinton sil	5.7	3.5	7.9	5.9	13.6	9.4	69
Henderson	Huntsville sil	4.8	4.2	6.0	6.0	10.8	10.2	94
Iroquois	Ashkum sil	3.7	2.8	5.3	3.0	9.0	5.8	65
Jackson	Alford sil	6.1	5.6	7.0	4.9	13.1	10.5	80
Jefferson	Bluford sil	6.1	5.7	10.0	6.7	16.1	12.4	77
Livingston	Swygert sil	3.5	2.9	4.3	3.4	7.8	6.3	81
Marion	Cisne sil	5.8	5.6	5.8	4.4	11.6	10.0	86
Mason	Onarga fsl	3.7	2.3	2.7	3.0	6.4	5.3	83
McHenry	Ringwood sil	3.4	3.1	3.8	4.2	7.2	7.3	100
Montgomery	Herrick sil	4.9	3.7	5.8	4.4	10.7	8.1	76
Montgomery	Cowden sil	5.8	5.5	5.7	3.4	11.5	8.9	78
Peoria	Tama sil	4.4	3.4	7.9	7.2	12.3	10.6	87
Pike	Herrick sil	6.9	5.5	5.6	3.2	12.5	8.7	70
Pike	Clary sil	5.1	4.1	7.0	4.9	12.1	9.0	74
Tazewell	Sumner fsl	3.5	2.3	2.9	3.0	6.4	5.3	83
Tazewell	Muscatine sil	4.0	2.6	5.8	5.3	9.8	7.9	80
Union	Tice sil	7.1	3.8	7.7	2.8	14.8	6.6	45
Wayne	Bonnie sil	7.3	5.7	8.0	5.3	15.3	11.0	71
White	Patton sil	4.9	3.7	4.9	3.0	9.8	6.7	68
White	Bonpas sil	4.7	5.5	6.6	4.7	11.3	10.2	90

Study of this table shows that only four of the 21 soils listed were recharged to 90 percent of capacity or better, while five were at 70 percent or lower. On the average, the soils were recharged to about 78 percent of capacity. Subsoils, on the other hand, were only about 69 percent recharged, with nine of the 21 at 70 percent of capacity or lower.

The amount of water that plants can use may be greater than the table shows, or it may be less. Plant roots may be able to penetrate deeper than 51 inches into the soil, as is true of Muscatine. In such soils, plants have more water to use than the table shows. In other soils like Bluford, Cisne, Cowden, and Bonnie, low soil fertility or slowly permeable subsoils may prevent plant roots from penetrating beyond 40 inches. In these soils plants may have less water than the table shows. Some of these soils may be considered drouthy even though they have a large storage capacity.

During April, rainfall did exceed the normal amounts in many parts of the state. Where soils were porous and able to absorb the extra water, recharge is likely to be about normal. Under these conditions there is now little danger of a water shortage unless rainfall is much below normal.

In parts of the state where rainfall has not been above normal, subsoil recharge is still likely to be below capacity. The need for above-normal rainfall has decreased but still may be present in some areas.

During June, July, and August, so much water is used by plants and by evaporation that the amount exceeds that provided by rainfall, and plants must depend on the supply of stored subsoil moisture. Most Illinois soils can store as much as 8 to 12 inches of moisture in the soil where corn and soybean roots penetrate. In these soils, water is seldom deficient unless rainfall is far below normal. In sandy soils like Onarga and Summer and soils with impermeable subsoils, less than 8 inches of stored subsoil moisture may be available to plants. On such soils moisture may be in short supply during most summers unless rain falls regularly.

Illinois agronomists suggest that farmers avoid overworking seedbeds this year to permit as much water as possible to infiltrate, particularly in areas where the subsoil recharge may still be below normal. Cultivating after rains will break up crusts that form on the surface and increase moisture absorption. If rainfall from June to August is about normal, moderate populations of about 12,000 plants per acre on soils similar to Cisne and 16,000 on deep, dark soils like Muscatine are likely to produce top yields in areas where the subsoil recharge is below normal. In areas where the subsoil moisture is normal, slightly higher plant populations are suggested.

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CROPS AND SOILS

NEWS

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URBANA

May 25, 1961

USE 2,4-D SAFELY

No. 177

The most widely used chemical herbicide is 2,4-D. Although new weed killers have become available in recent years, 2,4-D has continued to be popular. Because of its low cost and general effectiveness on broadleaf weeds, it is used widely in grass crops.

Unfortunately, 2,4-D can injure desirable crops. Tomatoes, grapes, beans, flowers, and certain ornamentals are very sensitive. Do not use 2,4-D in the vicinity of these crops.

Injury from 2,4-D occurs in two ways. One way is by drift of the spray particles in the wind. When field or roadside sprayers are used, many fine particles are released into the air. If the wind is blowing toward a sensitive crop, injury usually occurs. The distance that these particles will move through the air depends upon the particle size and the velocity of the wind. Do not apply 2,4-D within one mile of a sensitive crop if the wind is blowing toward the crop and the wind velocity exceeds 10 miles per hour. The second type of injury results from the evaporation of 2,4-D from sprayed plants. The ester forms of 2,4-D form a vapor after spraying that can be as harmful as the spray particles themselves. The vapor is dangerous because the wind may change direction the day after spraying and carry the vapor to sensitive crops. The amine form of 2,4-D is non-volatile. It is the only chemical form of 2,4-D that should be used in areas where sensitive crops are grown, and great care should be used to avoid drift of the spray particles.

The high-volatile esters of 2,4-D produce the most vapor. Low-volatile esters do not evaporate below 60° F. but begin to vaporize when temperatures rise above 60° F. Low-volatile esters are much safer to use than high-volatile esters, but the amine form of 2,4-D is by far the safest material to use in so far as volatility is concerned.

Recognizing the hazard of using 2,4-D in sensitive crop areas, the State Legislature passed a law in 1959 that can be used to prohibit its use in certain areas. This law has been invoked in Cook County and will undoubtedly be applied to other areas unless 2,4-D is used carefully. One of the major insurance companies in Illinois has excluded coverage of damage by 2,4-D ester in its farm liability policy because there is no defense in court cases. The amine formulations are not excluded from coverage. Such restrictions on the use of 2,4-D have resulted because of improper use. Unless it is used wisely, more restrictions are likely to be imposed.

The ester forms of 2,4-D are still recommended for controlling weeds in areas where there is no danger to sensitive crops. They are cheaper than the amine forms and are slightly more effective on certain hard-to-kill weeds. The ester forms of 2,4-D have been the best formulation for brush control and for pre-emergence treatments on corn.

(Continued on other side)

Follow these rules for safe use of 2,4-D:

1. Do not apply any form of 2,4-D on a windy day.
2. Use the amine form in areas where sensitive crops are growing, and keep a safe distance away from them.
3. Do not apply any form of 2,4-D when the wind is blowing toward a sensitive crop.
4. On farms and fields adjacent to sensitive crops, use other weed control chemicals. A wide variety of pre-emergence chemicals is now available for controlling weeds in corn and soybean fields.
5. Keep sprayer pressures under 30 pounds, and increase the amount of water to at least 10 gallons per acre. Both practices reduce the amount of small spray particles.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 29, 1961

No. 178

CONTROLLING WEEDS IN CORN AND SOYBEANS

Early control of weeds is the key to preventing costly competition between weeds and crops. Although late-season weeds can also rob crops of moisture and nutrients, it is those early weeds that begin growth with the crop that are most serious. Here are a few tips for knocking out early weeds:

Pre-emergence herbicides - More and more farmers are using weed-killing chemicals at planting time. This method is especially good for controlling annual grasses like giant foxtail. Pre-emergence herbicides usually do a good job of controlling early weeds when wet weather prevents timely cultivation. They are most needed on early planted fields.

Because the more soluble herbicides require less rain to move them into the weed seed zone of the soil, they have a higher probability of being effective than the less soluble herbicides. However, excessive rain may wash the more soluble form into the crop seed zone. At Urbana we can expect favorable rainfall in about three years out of four.

Early post-emergence herbicides - 2,4-D is still our most economical and effective tool for controlling many broadleaf weeds. It may be used almost any time to control weeds in corn except when the corn is tasseling and shooting ears. 2,4-D is most effective on weeds while they are young and tender.

How much 2,4-D to apply - The recommended amount of 2,4-D to apply per acre is 1/2 pound of the amine form or 1/4 pound of the ester. If you use a product that contains the equivalent of four pounds of 2,4-D acid per gallon, it contains one pound per quart or 1/2 pound per pint, so you will need one pint of the amine or 1/2 pint of the ester for each acre to be treated. The amount of acid equivalent is shown on the label. If you intend to use the ester form of 2,4-D, make sure there are no crops in the area that are susceptible to damage. Some farm liability insurance policies do not cover crop damage caused by the ester form of 2,4-D.

Post-emergence herbicides for soybeans - We have no good post-emergence herbicide for soybeans. A few farmers use a very light application of 2,4-D for serious weed problems in bottom lands, but it is recommended only for use by experienced operators.

Cultural methods for control

Rotary hoeing is a quick, economical method of killing early weeds. You can begin rotary hoeing after the weed seeds have germinated and you find little white seedlings below the soil surface. At 10 to 15 miles per hour you can cover a lot of ground and at the same time kill millions of weeds in a day. Once the grass weeds are three or four weeks old and well established, the hoe becomes less effective.

Shovel cultivators are still one of the most practical and economical tools for controlling weeds, especially between the rows. Since about 90 percent of the corn in Illinois is hill dropped or drilled, cross cultivation is rapidly passing out of the picture. Therefore, it is important to cultivate early and to adjust the shovels properly so that weeds in the row will be smothered with soil.

For the most effective weed control, supplement your cultural methods with chemicals, especially where weeds are a serious problem.

Flame cultivation is a new practice in Illinois. Although it has been used in the south, primarily on cotton, it has not been tested sufficiently in Illinois to be recommended for use on corn and soybeans.

Heat from a flame will control weeds when they are small if the flame is applied often enough. But corn may be damaged if flamed before it is 10 or 12 inches high. By this time the weeds that started growth with the crop are usually too large for the flame to be most effective. Reports from the south indicate that flame cultivation may damage soybeans.

The most likely use for flame cultivation would be to control grass weeds in the crop row. For the present, pre-emergence herbicides and cultural practices seem most practical for this job. Whether flame cultivation can serve as an alternate method for controlling grasses remains to be seen. Further testing is planned for 1961.

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NEWS

COLLEGE OF AGRICULTURE

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URBANA

June 9, 1961

AGRONOMY DAY, 1961

No. 179

It is our pleasure to invite you to the 5th Annual Agronomy Day sponsored by your Department of Agronomy at the University of Illinois. Here are the important details:

Date: June 28, 1961

Place: Agronomy South Farm

Time: 9:30 a.m. until tours are completed

The following tour program has been arranged:

The insect situation - H. B. Petty

Soybean diseases - D. W. Chamberlain

Reducing water use - M. B. Russell

Soil moisture studies - Arnold Klute

Wheat varieties - R. O. Weibel

Oat varieties - J. W. Pendleton

Breeding oats for yellow dwarf resistance - C. M. Brown

Grow a good lawn - H. R. Kemmerer

Fertilizer studies on soybeans - L. T. Kurtz

Studies on soil organic matter - F. J. Stevenson

Weed control - Ellery Knake

Establishing legumes with herbicides - B. J. Gossett

Alfalfa varieties - C. N. Hittle

New machines for harvesting forage crops - J. A. Jackobs

Fertility studies on corn - A. L. Lang

Rotation studies - L. B. Miller

Production potential of Illinois soils - L. J. McKenzie

Mycorrhizal infections on field crops - J. W. Gerdemann

Lunch will be available at the Agronomy Farm at \$1.00 per person.

Agronomy Day is your opportunity to attend this important annual tour of research in soils and crops on the Agronomy South Farm and to talk with agronomy specialists on specific problems you may have.

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June 12, 1961

No. 180

FIELD PLOTS SHOW NEW VARIETIES, NEW IDEAS

Leading farmers throughout Illinois are cooperating with their farm advisers and the University of Illinois to show you the newest crop varieties and new ideas in crop production. As you drive down the road this summer, you'll see these demonstration plots marked with a red, white, and blue sign that invites you to "Stop and Compare."

When you stop at these plots you'll see how these new varieties or weed control methods work under soil and weather conditions in your area. Your local farm adviser can tell you where the nearest demonstration plots are located.

This year demonstrations are under way with winter wheat, winter barley, spring oats, and soybeans. Weed control methods are also being tested. The map shows which counties have these demonstration plots.

The wheat demonstrations compare three new hard wheat varieties, Omaha, Warrior, and Ottawa, with the old standbys, Pawnee, Ponca, and Triumph. In the soft wheat section of southern Illinois, three new soft wheat varieties, Lucas, Redcoat, and LaPorte, are growing alongside the established varieties, Knox, Vermillion, and Dual.

The oat plots include Dodge, Portage, Putnam 61, and Tonka along with Clintland, Goodfield, Minhafer, Newton, Shield, and Beedee.

Ross, Henry, and Madison are three new soybean varieties in all the demonstration plots. Kent has been included in the southern part of the state, where it matures about 10 to 12 days later than Clark. Some of these new varieties are included to show how well they will grow under Illinois conditions. Some of them will not be adapted for use here.

The weed control demonstrations are designed to show use of pre-emergence herbicide in corn and soybeans. A few counties have special demonstrations using Atrazine to control quackgrass or Dowpon and Eptam to control Johnsongrass.

Besides the many farmers who are cooperating in field demonstrations, the Agronomy Department has demonstration plots at its research centers at DeKalb, Elwood, Urbana, Brownstown, and Dixon Springs. At Carbondale, Southern Illinois University and the University of Illinois operate the research center cooperatively. You might want to attend the field days at these centers this summer. But you are welcome to stop and look any time.

Agronomy Day at Urbana is June 28. Other field meetings include DeKalb, June 30; Carbondale, August 10; Brownstown, September 5; and Elwood, September 14.

WH- WHEAT
O-OATS
B-BARLEY
S-SOYBEANS
W-WEED CONTROL
● RESEARCH CENTERS

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June 26, 1961

PLANT TISSUE TESTING

No. 181

Farmers can use plant tissue tests to help determine the fertilizer needs of their growing crops, say University of Illinois agronomists. Tissue tests can measure the amount of nitrogen, phosphorus, potassium, or magnesium in the sap of the growing plants. Since nutrients that are lacking disappear first from the plant sap, the tissue test can detect nutrient deficiencies before the plant shows deficiency symptoms. When plants show deficiency symptoms, the test can help determine which nutrient is causing the deficiency. Here are a few tips to help farmers understand the use of plant tissue tests.

Can they replace the soil test?

Plant tissue tests do not replace the soil test for determining fertilizer needs. Tissue tests indicate only whether the plants are getting enough plant food from the soil. They cannot show how much plant food the plant needs or how much should be supplied to overcome the deficiency. Plants may show nutrient deficiencies even though the soil contains plenty of nutrients if their roots have been damaged by insects, disease, or careless cultivation.

When do you make tissue tests?

Potassium and phosphorus tests on corn can be made from the time the crop is about 18 inches tall until it tassels. Little can be done to overcome deficiencies discovered in the plants through tissue tests run after the corn has tasseled. Nitrogen tests should be run periodically throughout the growing period after the plant is 18 inches tall.

Where do you test?

Several tests should be run in different parts of the field. Never test the outside crop rows, and always test the same part of the plant. Any part may be tested. Potassium is seldom deficient in corn after it has tasseled.

What do the tests tell?

The potassium tissue test is useful for measuring the adequacy of the fertilizer program. It helps to identify potassium deficiency when symptoms may be caused by other plant diseases. The phosphorus test is also useful for testing the fertilizer program and for accurately identifying plant symptoms. A low test always indicates a deficiency, but a high test does not always mean high levels of phosphorus in the soil. The magnesium test is useful for recognizing magnesium deficiency from among other deficiencies. The familiar striping of the leaves of plants simply indicates general plant malnutrition and is not specific for magnesium.

The nitrogen test is the most useful of any of the present tests. A low test means that the present nitrogen supply of the plant is inadequate. It does not

(Continued on other side)

indicate how severe the deficiency may be or how well the soil can supply all the nitrogen needed to bring the crop to maturity. A positive test for nitrogen on any given day indicates that nitrogen was adequate on that day. Deficiencies may appear later.

Plants may show deficiency symptoms even though the soil is well supplied with nutrients. Other factors, such as root damage, may be the cause.

Plant tissue tests help to determine the real cause of deficiency symptoms. Farmers and farm managers may use tissue tests to follow the normal development of their crops through a periodic (weekly) plant tissue test program.

For information on how to obtain tissue test kits, see your county farm adviser.

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July 17, 1961

No. 182

RELIABLE SOIL TESTS COME ONLY FROM GOOD SAMPLES

Most approved Illinois soil testing laboratories have changed their testing procedures for lime and phosphate in the past year. These changes were made to use the most modern testing equipment and improve the quality of the tests. But to take advantage of these new testing methods, you must do a good soil sampling job. Your test will be no better than the sample. Here are some suggestions:

1. Take each individual sample from plow depth. Take the same amount of sample from each location so that it represents the correct portion of the composite sample. To make a composite sample, include five individual samples from a square rod. Mix each composite sample thoroughly, and place about 1/2 pound in a clean paper bag that has been clearly marked with the sample location.
2. Collect 11 composite samples from a 40-acre field. Mark the location of each composite sample on a map of the field. Then you can use the test results to show the plant-nutrient level in each part of the field. You may want to treat some parts of the field differently from others.
3. Use clean sampling tools. You can easily contaminate your soil samples if you use buckets and spades that have handled fertilizers, paint or whitewash. Contaminated samples are worthless.
4. Fill out the information sheets provided by your soil test laboratory. This information is very important in deciding what fertilizers or lime you may need and in making a good recommendation based on the tests.
5. File your soil test reports and information sheets for future reference. You may find them useful next time you test.
6. Keep records of the amounts of lime and fertilizers you use on your fields, as well as the crop yields you obtain.

These suggestions will help you make better future decisions in fertilizing and liming your fields.

Your farm adviser or the University of Illinois Department of Agronomy can supply detailed instructions on collecting soil samples. If you follow these instructions carefully, you will get representative samples from your fields. No matter how well equipped the laboratory or how skilled the technician, your soil test will be no more accurate than the sample you take for testing.

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RECEIVED

August 7, 1961

Aug 13 1961 No. 183

TAKE A NEW LOOK AT YOUR LIMING PROGRAM

RECEIVED

Since 1945, Illinois farmers have increased fertilizer use by almost $3\frac{1}{2}$ times, but their lime use has dropped by one-half. The additional plant food is good, but it needs to be balanced by increased limestone. Is your liming program adequate? Here are a few ideas to keep in mind:

Better tools are now available for measuring lime needs

Many soil test laboratories are now using the pH meter, a new tool for measuring lime needs. It tells whether the soil is acid or alkaline, and it also has these advantages:

1. Since it is an electrical instrument, it is more precise than the old visual method.
2. The test with the new instrument does not depend on the amount of soluble iron in the soil as the old method did.
3. The pH meter accurately measures the pH in alkaline soils as well as in acid ones. With the new test, it is possible to plan a liming program for acid soils and a good program for using phosphate fertilizers on alkaline soils.

The cropping system is important

Strongly acid soils need lime no matter what crop is being grown. Red clover and alfalfa, however, need more lime than soybeans or corn. When large amounts of nitrogen are used in an intensive corn-growing system, the soil pH should be checked every four or five years because nitrogen fertilizers tend to make the soil slightly more acid. Additional lime will be needed to neutralize this acidity.

The deeper you plow, the more lime you need

With more powerful tractors, many Illinois farmers are now plowing deeper. This means that more limestone is needed to correct acidity. If four tons of lime were needed when a field was plowed six inches deep, six tons are needed when it is plowed nine inches deep.

Lime quality has improved

Working together, limestone industry representatives and University of Illinois agronomists have made it possible to evaluate the effectiveness of different-sized limestone particles to neutralize soil acidity over periods of one, four, and eight years. Finely ground limestone acts quickly; coarser material acts more slowly but will eventually be effective.

Several times during the year the state A.S.C. office in Springfield obtains information on the amounts of many samples that pass through 8-, 30-, and 60-mesh screens. They give this information to the county offices.

Knowing the fineness of the grind and the neutralizing value of the limestone, you can then compare limestone products that vary in fineness and price. You may wish to pay a premium price for extra-finely-ground limestone to neutralize soil acidity quickly. On the other hand, you may find it more economical to buy limestone of average fineness if you have been using limestone regularly over the years.

Your farm adviser, limestone supplier, or fertilizer dealer can give you the latest suggestions on amounts of limestone to apply after the soil is tested.

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August 16, 1961

AUG 28 1961

No. 184

WHEAT PLANTING FOR 1962

UNIVERSITY OF ILLINOIS

Wheat has become an important grain crop in Illinois. Illinois farmers now grow about $1\frac{1}{2}$ million acres a year. Since 1900, wheat production has risen 36 percent in Illinois compared with about 20 percent in the country as a whole. Here are a few tips to keep in mind as you approach planting time for the 1962 crop:

Wheat has a new position in the rotation

Wheat once followed oats as a legume crop in the rotation. Corn, oats, and wheat were the important crops. Now soybeans have also become a major crop. They usually follow corn in the rotation. Wheat usually follows soybeans because it can be planted after soybean harvest. Planted after soybeans, wheat follows a crop with a high plant nutrient requirement. So remember the plant food needs of the wheat crop.

Plant recommended varieties

When you select seed wheat, consider yields, straw strength, winter hardiness, resistance to disease and insects, tendency to shatter when ripe, and soil fertility level.

University of Illinois agronomists recommend these hard wheat varieties: Triumph, Pawnee, and Ponca. They recommend these soft red varieties: Monon, Knox, Vermillion, Dual, Seneca, and Lucas. The suggested planting rate is about $1\frac{1}{2}$ bushels of seed per acre. The seed should be cleaned and treated and planted in a well-prepared seedbed.

Nitrogen and phosphorus: key nutrients to high yields

Nitrogen pays good returns on wheat following corn and soybeans, according to results on Drummer silty clay loam at the University of Illinois Agronomy Farm at Urbana. Rock phosphate broadcast at 10- to 12-year intervals also gives good returns. But superphosphate drilled with the wheat raised the yield from 25 to 41 bushels an acre on a Proctor silt loam soil. These results show that plenty of phosphorus is especially important for good wheat yields.

Phosphorus should be applied at seeding time. Nitrogen may be applied at seeding time or as a top dressing in the spring at green-up time. Wheat seldom responds to potassium unless the soil test is low. Apply potassium to meet the needs of the forage legume. Consult your farm adviser or fertilizer dealer for details.

Control insects and disease

For several years weather conditions during flowering and heading have favored spread of loose smut. Knox and Dual are susceptible to loose smut, and they have been grown on about 30 percent of the acreage. Treat your seed and isolate your wheat fields from smut-infested areas, particularly if you are using Knox or Dual.

You can avoid Hessian fly damage in one of three ways: (1) Wait until after the fly-free date to plant. The fly-free date is September 18 in northern Illinois and October 12 in southern Illinois. (2) Use fly-resistant varieties, such as Dual, Monon, and Ponca. (3) Apply 10 percent granular Thimet phorate at the rate of 10 pounds per acre as a soil treatment. But keep livestock off Thimet-treated fields.

In summary

1. Use an adapted variety.
2. Clean and treat your seed.
3. Prepare a good seedbed.
4. Plant about $1\frac{1}{2}$ bushels of seed per acre.
5. Fertilize with phosphorus and nitrogen.
6. Control insects and disease.

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URBANA

August 21, 1961

No. 185

TIMELY TIPS ON FORAGE MANAGEMENT

The number one forage crop in the midwest area is alfalfa. Two million acres are planted to alfalfa in Illinois alone. Red clover ranks a close second in acreage. These two examples point out the importance of forage crops to midwest farmers and the need for their proper management. There are several timely management tips to consider at this time of year.

Observe late-cutting dates for legumes.

Legume forage plants need to make sufficient top growth before frost to store nutrients in the roots for overwintering. Clipping seedlings or harvesting forage crops late in the season can kill or set back the plants. The recommended last safe cutting dates for the season are as follows:

Northern Illinois.....	September 1
Central Illinois.....	September 7
Southern Illinois.....	September 14

Observing these dates for cutting and pasturing legumes will help to make the 1962 forage crop more productive.

How economical is fall fertilization?

Agronomists believe that fall application of potash, phosphate, or lime probably isn't too profitable on established stands and new seedlings unless the soil is low in plant nutrients. Then it may pay to fertilize. But good results may be obtained from applying fine limestone. Top dressing seldom improves the next year's crop if the soil was fertilized according to needs indicated by soil tests before new seedlings were planted. In properly fertilized soil, winter weathering releases sufficient nutrients for the first crop the following year. A top dressing of potash and some superphosphate immediately after the first crop is removed may give profitable returns on the remaining season's cuttings.

If soil tests show the need, fall is a good time to fertilize.

Testing and fertilizing the soil in the fall permits soil deficiencies to be corrected during the slack time of year so that plant nutrients will be readily available for the spring crop. In a regular rotation it is best to apply fertilizer before the corn crop to allow the fertilizer to mix well with the soil. New spring seedlings should be fertilized in the fall to promote vigorous growth.

Wise seed selection is important.

For short-term alfalfa stands, such as rotation pastures or short crop rotations, Alfa, DuPuits, Atlantic, Buffalo, Ranger, and Vernal are recommended. Buffalo is not winter-hardy and is recommended only for the southern two-thirds of Illinois. Buffalo, Ranger, and Vernal are recommended for long-term stands because of their bacterial wilt resistance.

The Kentland variety of red clover is highly recommended for the southern two-thirds of Illinois. It will frequently produce high-quality second cuttings and is fairly resistant to root rot and southern anthracnose. Dollard is winter-hardy, resists northern anthracnose, and tolerates aphids. Seed quality is important. Be sure the seed is thoroughly tested and certified. A blue tag on a bag of alfalfa seed indicates certification. Using certified seed is important for getting good yields of high-quality forage. The forage crop will be no better than the seed you plant.

It is now too late to establish new seedings.

New seedings for next year should not be made after September 1. Legume seedings made after the second or third week in August will not have time to get established before frost. It is best to wait and start the legume with a nurse crop in the spring.

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August 28, 1961

No. 186

THE TIME IS RIGHT FOR GRASS WATERWAYS

Many Illinois farmers now have an opportunity to establish grass waterways on their farms. Land that has been entered in government grain programs can be improved without damaging growing crops. University of Illinois agronomists say that late summer is an ideal time for starting grass waterways. Here are a few pointers to keep in mind if you plan to develop some new waterways on your farm this year.

The first step should be to talk with the local ASC and SCS representatives. They can give helpful hints in locating and constructing the waterway and may be able to arrange financial help.

Make your waterways good and wide. They may have to carry off a lot of water. Make them deep enough to do the job, but shallow enough to allow farm machinery to cross them easily. If there is a good sod in the draws and low spots, use it. In a waterway it is easier to thicken up an old grass stand with more seed and fertilizer than to start a new sod.

Where seeding is needed, work the soil into a moist, fine, compact seedbed. A corrugated roller does an excellent job of firming the seedbed and reducing the danger of washing.

It is important to have vigorous growth in new waterways to establish a good cover and prevent damage from heavy rains. Test the soil and use plenty of plant food. A heavy coating of strawy manure (8 to 10 tons per acre) will provide cover until the grass is established and will add to the soil nitrogen supply. When manure is not available, use 100 to 150 pounds of ammonium nitrate or its equivalent for a nitrogen supply. A soil test is important to determine phosphorus and potassium needs. A good phosphorus supply is important for early seedling growth. Late summer or early fall is usually the best time for seeding in central and southern Illinois. Spring seedings are more common in the northern part of the state. Seedings made in the fall are less likely to be washed out than those made in the spring. There is also less competition from weeds in fall seedings.

Pure grass stands provide a better sod than grass-legume mixtures. Tall fescue grows rapidly and is recommended for central and southern Illinois. Smooth brome does best in the northern part of the state. Kentucky bluegrass also does a good job, but has a shallower root system. It will usually come into the stand by itself without seeding. Reed canarygrass can be used in waterways that stay wet and marshy most of the year. Timothy and redtop are shallow rooted and develop less desirable sod covers.

Many farmers use a light seeding of spring grain or ryegrass for a nurse crop to help hold the soil. Keep the seeding rate low, since the competition can reduce the grass stand.

Why not use legumes? Soil conditions in the waterway are not suited for legumes. Excess water usually causes them to die out, leaving bare spots. Pure grass stands are most suitable.

Thick stands of grass are desirable. Therefore use two or three times as much seed as you would under ordinary field conditions. Seed 25 to 30 pounds of tall fescue or brome grass, 15 to 20 pounds of reed canarygrass, or 6 to 8 pounds of timothy or redtop.

Remember, waterways and wet spots are not the easiest places to establish new seedings. Your first try may fail. But do not be discouraged. Try again. The reduction in soil losses from your fields will repay the extra effort.

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September 11, 1961

No. 187

USING PHOSPHORUS FOR ILLINOIS CROPS

Phosphorus fertilizer is absolutely necessary in order to make a profit from crop production. If no extra phosphorus were added, Illinois soils would produce only about 85 percent of what they are capable of producing. But that extra 15 percent is what puts a profit in your farm business.

All Crops Need Some Phosphorus

Wheat, oats, alfalfa, and clover all have high phosphorus needs. They may fail completely without a phosphorus fertilizer program, especially in southern Illinois.

Young seedlings need phosphorus especially. When you make extra phosphorus available near the row, you give corn a quick start, although you may not always increase the yield. Wheat also responds well when phosphorus is placed near the young seedlings in the fall.

Several Forms Available

You can use phosphorus in many forms--rock, super, triple super, cal-meta, and dry or liquid mixed fertilizer. Liquid phosphoric acid was tried in a few places last year, and the Department of Agronomy is cooperating in several tests this year. You can get more information on when, where, and how to apply phosphorus fertilizers from your farm adviser and soil testing laboratory.

Phosphorus Reacts Differently in the Soil

Phosphorus does not leach away or pass into the air as a gas like nitrogen. Tests on the Illinois soil experiment fields show that after 50 years of phosphorus application, most of this plant food element is still in the 12-inch surface layer. The zone from 12 to 18 inches below the surface has changed little in phosphorus content.

Since phosphorus remains in the soil until used by crops, it is possible and profitable to build up a supply in the plow layer. In Illinois soils this has been done mainly with rock phosphate in a lime-legume-rock phosphate program. In many farming systems such a program has been very economical, especially if CP assistance is available.

Phosphorus in the soil and soluble phosphate fertilizers are most available when the soil is in a pH range of 6.0 to 7.0. When the soil is strongly acid and has pH below 5.0, soluble phosphorus fertilizer is quickly converted to nearly unavailable iron compounds.

On the other hand, in alkaline soils above pH 7.5, phosphorus changes to tricalcium phosphate, which is very slowly available. For these reasons, no build-up program is recommended on alkaline soils. It is more economical to fertilize with phosphorus on a year-to-year basis.

Rock phosphate is considered to be most available when the pH is about 6--a slightly acid condition.

New Method for Showing Phosphorus Content

In the future we expect that fertilizer analyses will be expressed in the elemental form. For many years P_2O_5 has been used to express the phosphate content of fertilizers. The nutrient element phosphorus (P) makes up about 44 percent of P_2O_5 , so 20 percent superphosphate is about 8.8 percent phosphorus; 46 percent triplesuperphosphate is 20 percent phosphorus. Extension fertilizer information and soil test interpretations are going to show the amount of elemental phosphorus along with the commonly used phosphate figure. You'll want to become familiar with this new way of expressing the phosphorus content of fertilizers.

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AGRONOMY

SEP 25 1961

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 25, 1961

No. 188

MANY ILLINOIS SOILS NEED POTASSIUM

Illinois soils vary greatly in their ability to supply potassium for high crop yields. Many northern Illinois soils are naturally high in potassium and often test 180 to 225 pounds of potassium per acre even after 100 years or more of cropping without treatment. The soil layers below the topsoil usually contain even greater amounts of potassium. Soil tests on such soils change little over a 10-year period.

The strongly weathered soils of southern Illinois are low in available potassium. Tight subsoils also restrict the growth of plant roots so that the roots are able to contact less soil from which to obtain potassium. On these soils and on sandy soils generally, a potassium test of 150 pounds per acre shows that the soils have been heavily fertilized. Since they have a low reserve, the potassium test may drop sharply in a few years, and the test should therefore be repeated every four to five years.

Organic soils are inherently low in potassium because the potassium in organic material is very soluble and leaches away readily. Sandy soils contain so little clay that they are unable to store a reserve supply of potassium.

What the soil tests show

The soil test measures the amount of potassium that is soluble and available to the plant if the root system comes into contact with it. It is calculated for an acre of soil 6 inches deep. More research is needed to find out how much potassium comes from the soil layers in the rooting zone below the topsoil and how important it may be.

Where and when to apply potassium

The use of potassium will be more efficient if you apply it ahead of the crops that respond best to an application of potassium. Corn and legumes are most sensitive to a potassium shortage. If a field needs less than 120 pounds of K_2O (100 pounds of K), the entire amount can be applied ahead of the corn. Most of the potassium will then be returned to the soil in the cornstalks for a second corn crop or for the soybeans that follow. If a small grain follows the corn, the potassium will be available for the alfalfa or clover that is seeded in the small grain.

It is not wise to make large buildup applications of potassium directly ahead of alfalfa or clover. These forage legumes take up far more than they need for optimum yields ("luxury feeding"), and the potassium will not be in the field for following crops.

When the soil tests show that more than 200 pounds of K_2O (166 pounds of K) is needed, apply about 120 pounds of K_2O for the corn and an equal amount ahead of the alfalfa or clover in rotation. The result will be a gradual buildup of potassium and efficient use of the fertilizer. If the total amount is applied at one time, a considerable amount of potassium may revert to the form in which it is found in the basic soil minerals. Then it will be very slowly available.

There is no hard-and-fast rule for dividing the potassium over a four-year cropping period. Some may be applied to each crop. However, any added effectiveness from small, frequent applications must be balanced against the extra time and cost to make them. If potassium is low on all fields, some should be applied to every field to start with instead of making a heavy treatment on only part of the acreage.

Potassium fertilizers

Potassium may be supplied in a straight potassium material, in a mixed fertilizer, or in a blend. The potassium is all water soluble and thus is equally available. For Illinois field crops, the muriate form (KCl) is equal to the sulfate form.

Safe limits for drill applications

Since potassium salts are very soluble, large amounts cannot safely be placed near the seed. For corn, nitrogen and potassium combined should not exceed about 40 pounds when applied through a split boot. Larger amounts are safe when applied through a planter with the fertilizer placed to the side, away from the seed.

For small grains, K_2O in amounts up to 40 pounds (33 pounds of K) plus nitrogen is safe when applied through the drill.

Soybeans are very sensitive to salt injury, and no more than 40 pounds of K_2O (33 pounds of K) is suggested for side placement. For soybeans, broadcast application of all potassium is preferred.

Potassium in crop residues and manure

The potassium in corn and small grains is mainly in the stalks and straw and is readily dissolved in water. When these residues are left on the field, as in a grain system of farming, the potassium is effectively and uniformly returned to the soil. In a continuous corn system yielding 100 bushels per acre, only 33 pounds of K_2O is removed per acre each year. In a livestock system, where the hay and grain straw is usually removed, the actual removal of nutrients from a given field is much higher than in a cash grain system. In a corn-corn-oats-alfalfa-alfalfa system, the average annual removal is about 97 pounds and only part of this amount is returned in manure.

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CROPS AND SOILS

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UNIVERSITY OF ILLINOIS

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October 2, 1961

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This issue of Agronomy News is an index to all issues from 100 to 188. It will serve as a convenient guide for making your personal set of Agronomy News a useful and handy reference.

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CROPS AND SOILS

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October 18, 1961

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FALL APPLICATION OF FERTILIZER

Fall is a fine time to have your soil tested and to apply lime, phosphorus, and potassium in your fertility buildup program. You often have more time between other jobs than in the spring. Also, you may get some discount in price. If you custom-spread fertilizer in the fall with heavy trucks, compaction in wheel tracks should not be a problem because freezing and thawing and wetting and drying of the soil over winter will eliminate it.

Here are some questions and answers that will help you decide whether to apply fertilizer in the fall:

Will fertilizer leach away?

Little lime, phosphorus, or potassium moves more than an inch away from where it is applied in any one year. You need to be concerned only with the leaching of nitrogen. Recent research indicates that leaching is usually not serious on silt loams and silty clay loams. But more leaching usually occurs on sandy soils, and therefore fall application of nitrogen is not recommended on these soils.

The ammonium form of nitrogen has an advantage over the nitrate form because negative electric charges hold it on the soil clay and organic matter. Fertilizers sold in Illinois are mainly of the ammonium type. Even ammonium nitrate and liquid nitrogen fertilizers are made up at least half of ammonium. Medium- and fine-textured soils prevent ammonium fertilizers from leaching.

Will fertilizer nitrogen "evaporate"?

The free ammonia (NH_3) in some liquid fertilizers and in anhydrous ammonia will evaporate immediately unless it is covered with moist soil. Recent research indicates that unless urea compounds are covered or washed into the soil by rain they change chemically and evaporate when they come into contact with dead plant residues.

Nitrogen is also lost into the air through denitrification, the process that converts more complex nitrogen compounds to gaseous forms. We believe it to be an important cause of nitrogen loss on poorly drained soils in most years and on well-drained soils in certain wet periods. The changes in nitrogen from ammonium to nitrate and vice versa are caused mainly by soil organisms. When the soil is waterlogged, some of these tiny living creatures take oxygen from nitrates, leaving nitrous oxide and nitrogen, which are gases that are lost to the air.

(Continued)

Denitrification losses are difficult to measure under field conditions. At present we feel that fall application of nitrates may be questionable on soils that are frequently waterlogged for considerable periods in the fall or early spring.

Will fertilizer be lost by erosion or carried off in solution?

Erosion of surface soil does remove fertilizer. The best solution is to farm in a way that reduces erosion. Applying fertilizer on frozen soil in sloping fields is wasteful. When the soil is not frozen, rain will carry soluble fertilizer nutrients into the soil and keep them from being carried off in solution. Soil nutrients will wash away, however, if runoff carries away the topsoil during heavy rains.

Is broadcasting fertilizer as efficient as drilling?

Agronomists at the University of Illinois feel that building up the supply of phosphorus and potassium in the soil is a good investment. For most profitable yields, some additional fertilizer may be used on corn and wheat even when the soil test is rather high. Large amounts of nitrogen needed for corn on many farms cannot be efficiently applied through the planter. Broadcasting or sidedressing is therefore the only practical method of application. Broadcasting as used here includes applying dry, liquid, or gaseous forms of nitrogen that are not applied with the planter or by sidedressing.

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CROPS AND SOILS

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October 23, 1961

No. 191

MAKE THE MOST OF YOUR 1961 CORN CROP

For the best returns from the 1961 corn crop, Illinois farmers need to harvest it carefully and store it safely. Harvesting losses often amount to 8 percent or more of the crop. Insects and rodents can damage large amounts of the stored grain if they have access to it. In addition, storage at improper moisture levels can cause still more losses. Here are a few tips to keep in mind for this year's corn harvest:

Keep storage facilities in good condition.

Corn storage bins must meet several important requirements. The structure should be strong enough to resist the pressure of the grain. Poor construction can cause costly repairs and grain losses.

To keep out snow and rain, all structures should be weathertight. Special attention should be given to knotholes and cracks in wooden structures and loose bolts and bolt holes in metal structures. It is also important to keep floors watertight to prevent ground moisture from moving through the floor to the grain.

Proper storage structures should be easy to fill and empty and easy to inspect, fumigate, and clean.

New kinds of storage facilities are now available.

Corn is now being stored above 23 percent moisture in airtight structures. Glass-lined silos can be bought in several sizes and seem to give satisfactory results. Ordinary silos must be as nearly airtight as possible to cut down spoilage and do as good a job as the glassed-lined silos. Some farmers have lined their old silos with plastic liners to prevent spoilage.

What moisture levels are safe to avoid spoilage?

For the most part, corn needs to be drier when it is to be stored for a long time or kept in areas that are warm and humid or in areas where insects are a special problem. The highest safe moisture content for storage in cribs is about 20 percent.

Moisture levels for stored shelled corn vary with length of storage and region of the country. In Illinois shelled corn to be stored for a year or more should be dried to 13 percent moisture. Drying to 15 or 16 percent moisture is safe for storage over the winter, and 13 or 14 percent is safe for storage until the warm season. High-moisture corn should have at least 23 percent moisture for safe storage in airtight structures. Corn can be stored safely in regular silos at 23 percent moisture.

Do not guess the moisture content. The corn should be tested for moisture at a local elevator or with "on-the-farm" testers, now on the market.

Good methods of drying are now available.

Drying is necessary to condition high-moisture corn for storage. There are four recognized methods of drying: (1) natural ventilation, (2) mechanically with unheated air, (3) mechanically with unheated air supplemented by small amounts of heat, and (4) heated air.

Prevent insect and rodent damage.

Insects and rodents contaminate food grain and make it unfit for human consumption. As early as 1957, a carload of grain was considered contaminated if it contained more than one rodent pellet per pint or if more than 1 percent of the grain was damaged by insects.

Rats destroy food and pollute it. Thirty rats eat as much as one dairy cow and waste ten times as much. In six months one pair of rats will eat 27 pounds of food, will deposit 25,000 droppings, will shed about one million hairs, and will void about six quarts of urine.

Preventive measures, such as screening, clean-up, rat-proofing, bin sprays, grain protectants, fumigants, and rodenticides, will more than pay their way. Animal pests can be starved or can be killed with poison or gas.

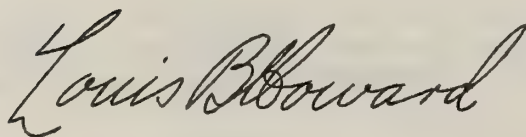
Rodents can be kept out by tacking sheet metal on the outside of the building near the ground level. Doors and other openings should be rodent- and bird-proof and should be kept closed when not in use. Double walls are a good harbor for rats and mice.

It is better to prevent insect damage than to correct it. Grain is nearly always clean in the field. It becomes contaminated when it is handled. Before storing the grain, spray the bins to kill insects. Clean old grain out of machinery just before harvest. Clean up the area outside the bins.

After the grain is in the bin, protect it from insect damage with a dust or fumigant. Keep a close eye on the grain, watching for insect build-up, and fumigate if necessary.

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AGRONOMY

CROPS AND SOILS

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URBANA

November 6, 1961

No. 191

ILLINOIS OAT VARIETY TRIALS, 1961

Profitable oat production depends on continuous variety testing. Often new diseases sweep through to knock out established varieties. With most crops, using an outmoded variety is merely poor business. In oats, it can put you "out of business." For this reason widely used varieties are constantly re-evaluated and new lines are well tested before taking their place on the firing line.

To keep you up to date on promising new varieties as well as to check those now in use, University of Illinois plant breeders carry on extensive tests at three main stations, one each in northern, central, and southern Illinois. County farm advisers, working with farmer cooperators, also take part in a wide program of variety demonstrations. Agronomists then pool these results as a base for variety recommendations. Because performance often varies from year to year, agronomists require a minimum of two years of testing before considering a variety for recommendation.

This year's yield results are presented in the tables below. Shield and Putnam 61 performed best among the early varieties. The mid-season varieties Newton, Beedee, and Clintland 60 also performed well. The stiff-strawed Goodfield gave top performance where lodging was a problem. Dodge, a newcomer in its first year of testing, showed considerable promise. Another newcomer, the early-maturing Tonka from Oklahoma, was high in test weight but low in yield except at Urbana.

The late-maturing varieties Garry and Portage were high yielders but weak in straw, frequently showing severe lodging.

Yields from the University-conducted trials are given in Table 1. The two-year averages are more reliable than the 1961 results taken alone. Results from the county demonstrations are given in Table 2.

Table 1. University of Illinois Spring Oat Trials
1961 and 1960-61 Average Yields (bu./acre) and 1961 Test Weights

Variety	Shabbona			Urbana			Brownstown		
	DeKalb County			Champaign County			Fayette County		
	1961	Test		1961	Test		1961	Test	
		2-yr.	wt.		2-yr.	wt.		2-yr.	wt.
	Av.	1961		Av.	1961		Av.	1961	
<u>Early</u>									
Minhafer	101	83	39	91	85	37	69	65	34
Nemaha	91	80	39	98	85	37	75	70	35
Putnam 61	102	--	40	100	--	36	81	--	35
Shield	124	100	40	90	85	37	77	74	34
Tonka	93	78	42	99	93	38	75	72	37

(Continued)

Mid-Season

Beedee	115	97	40	88	88	38	--	--	--
Clintland	105	82	39	85	74	36	71	70	35
Clintland 60	103	81	39	88	79	36	73	69	34
Clinton	103	78	39	84	78	36	63	65	33
Dodge	115	--	40	88	--	38	76	--	36
Goodfield	102	88	40	89	81	40	75	70	36
Newton	106	90	41	97	87	38	86	77	36
Nodaway	98	--	40	94	--	38	70	--	36

Late

Garry	129	104	38	88	85	36	--	--	--
Portage	114	95	40	83	82	38	--	--	--

Table 2. Illinois County Spring Oat Demonstrations
1961 Average Yields and Test Weights

Northern Illinois (14 locations)			North-Central Illinois (15 locations)			South-Central Illinois (5 locations)		
Bu. per	Test		Bu. per	Test		Bu. per	Test	
acre	weight		acre	weight		acre	weight	

Early

Putnam 61	84	36	72	36	69	34
Shield	85	35	76	36	72	33
Tonka	73	37	67	39	56	37

Mid-Season

Beedee	91	36	83	36	61	34
Clintland 60	85	36	72	35	60	35
Dodge	85	36	78	36	68	36
Goodfield	89	37	67	38	67	37
Newton	84	36	79	36	68	35

Late

Portage	93	36	81	35	70	33
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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

November 20, 1961

No. 193

BEWARE OF UNADAPTED CLOVER SEED

Beware of non-adapted mammoth and red clover strains when buying your seed for next spring!

The 1961 Illinois seed crop was the smallest in years. Agronomists at the University of Illinois expect seed from other areas to move in to fill the gap. Seed production in Illinois is estimated at only 57 percent of the 1960 seed crop and only 80 percent of the average of the previous 10 years.

Certified seed of the adapted varieties Kenland, Dollard, and Lakeland are dependable. These three should be first choice. Clover seed from other "corn belt" states is usually acceptable.

Canadian mammoth clovers of the Altaswede type are particularly unadapted to Illinois conditions. The table below presents 1961 data from the University trials at the Northern Illinois Agronomy Research Center in DeKalb County. Note that the Canadian Altaswede was well below both of the adapted mammoth strains as well as the red clover varieties in both first-cutting and total yields. From these results it's easy to see that you should not grow Altaswede or Canadian mammoth of Altaswede type under any circumstances.

1961 RED CLOVER VARIETY TRIAL

Northern Illinois Agronomy Research Center

DeKalb County

	Hay yield at 12 percent moisture			Season total
	June 12	July 20 (tons per acre)	Aug. 21	
Common Mammoth	2.1	.6	.6	3.3
Altaswede Mammoth	1.3	.2	.3	1.8
Common Medium	2.2	1.4	.5	4.1
Kenland	2.1	1.3	.5	3.9
Dollard	2.1	1.3	.5	3.9
Lakeland	2.3	1.1	.5	3.9

These results are typical of the performance you can expect from Altaswede and other Canadian mammoths.

Altaswede is descended from a Swedish mammoth type that was adapted to Alberta, Canada--hence the name Altaswede. It has done miserably in trials in Wisconsin as well as in Illinois. Altaswede competes poorly with companion crops. It suffers severe damage from leafhoppers because of sparse hairiness and, like other mammoths, it is a single-cut clover, producing little or no aftermath.

The common red clover disease called northern anthracnose did not affect the trial reported on the other side. Had it been present, yields of common medium and Kenland would have been reduced. Dollard and Lakeland are resistant to northern anthracnose. Agronomists recommended them for the northern half of Illinois. Kenland is recommended for southern Illinois. It is resistant to southern anthracnose, which affects other varieties in that area.

So, if you're shooting for high forage yields, use one of the red clover varieties in place of mammoth. The one-cut growth habit of mammoth means lower seasonal yields. In addition, mammoth clover hay is often coarser and lower in quality than that made from red clover.

Don't be fooled by the low price tag on the bag of an unadapted type like Altaswede. It costs far more to grow cheap unadapted clovers than to grow recommended varieties. The tons of forage that are never produced cancel out the few cents' difference in the seed price. The only "advantage" of cheap seed of this type is that there is less work at harvest time.

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AGRONOMY

CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

URBANA

November 27, 1961

No. 194

ALFALFA CHOICES FOR 1962

If you select one of the best new alfalfa varieties now available for 1962, you can expect easier establishment, earlier spring growth, faster recovery, and higher yields. The new varieties are the best we've ever had.

DuPuits and Alfa stand at the top for short rotations, and Vernal, Buffalo, and Ranger for long-term stands.

DuPuits and Alfa, developed from European strains, grow vigorously as seedlings, so they are much less of a problem to get established than older varieties. They start off earlier in the spring, bloom a week to 10 days earlier than varieties like Ranger, bounce back faster after cutting, and grow later into the fall. They are most resistant to insects and leaf diseases than Ranger. These varieties average nearly a ton more hay per acre than Ranger for the first two years of production. They are susceptible to bacterial wilt, however. This disease often kills out alfalfa in the third harvest year. For this reason, use DuPuits or Alfa only if you're planning for a short-term stand.

Alfa and DuPuits have performed equally well in Illinois trials. Seed supplies of DuPuits are plentiful, while those of Alfa are limited.

Since both Alfa and DuPuits mature a week to 10 days ahead of Ranger, they must be cut or pastured earlier to obtain high-quality forage. For best results, cut in late May just as they come into bloom. These varieties should be your first choice if you want top yields for one or two years and if you are equipped to get your crop off early. They will give you the best chance to harvest five tons of hay or more per acre.

For highest quality, cut DuPuits and Alfa four times a year instead of three. Total season yield will be down but still equal to three cuttings of Ranger or Buffalo, and quality will be much higher.

Best Choice for Longer Stands

If you want alfalfa to last for three years or more, or can't cut hay until after the first week in June, then seed Vernal or Buffalo. Both are resistant to bacterial wilt and will survive for many years under adequate management. They yield somewhat less than DuPuits and Alfa in the first and second years, but maintain production into the third and fourth years, when Alfa and DuPuits have gone out from bacterial wilt.

(Continued on other side)

Vernal is best adapted for pasture. Since it has a broad crown, it is resistant to trampling and grazing. Although seed supplies have been limited in the past, they will be adequate this year. Buffalo seed will be limited this winter because of low seed production in 1961.

Ranger has been a standard variety for several years and still performs well throughout Illinois. It is wilt resistant and will survive well for many years if properly managed. It yields somewhat below Vernal and Buffalo. Ranger is less resistant to leaf diseases and insect damage than the newer varieties.

Looking Ahead

A promising newcomer is FD-100, a Flemish type that appears to perform much like DuPuits and Alfa. Illinois tests on this variety are not yet completed.

A number of private brands are being offered for sale. Many of them have been entered in University of Illinois trials, and information will be available in the next few years.

Culver, developed in Indiana, is being tested and looks promising. It has bacterial wilt and spittle bug resistance and is winter-hardy. More data are needed before it can be recommended in Illinois.

Soil Fertility Important

Remember that the best alfalfa variety cannot grow in an acid soil. Make sure that your soil tests show a pH of 6.2 or above before seeding alfalfa. Potash and phosphorus must also be adequate or alfalfa will not produce the yields of which it is capable.

For Extra Yield

For an added forage yield bonus, try orchardgrass in the mixture with your alfalfa. You'll have more grass in your second growth than you'll get from other grasses. And you'll have more forage if the alfalfa thins out.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA
UNIVERSITY OF ILLINOIS

December 4, 1961

No. 195
FEB 1 1962

WHAT CAUSED ALL THE CORNSTALK BREAKAGE THIS YEAR?

LIBRARY

This year most Illinois farmers found more cornstalk breakage than they have seen in many years. Agronomists and plant pathologists found the situation serious in almost all areas of the state.

Two types of stalk breakage have been found, one due to disease and the other due to climatic factors.

Much of the breakage was caused by stalk rot. Several organisms can cause this disease, but this year's villain was the gibberella fungus, which rots out the stalk at the base, weakening the plant so that it falls over easily. We see some stalk rot every year; however, it was more serious this year than it has been for a long time.

The second type of stalk breakage was due primarily to climatic factors. Corn made rapid early and midseason growth in most areas of the state and then ran into hot, dry weather in late August and September. The dry weather apparently hit the corn at the time the strong supporting fibers should have been forming in the stalks. This supporting tissue did not develop properly, and much Illinois corn was left with tall, heavy tops and big ears, all supported on weak stalks. This left them easy marks for winds. Hurricane Carla and subsequent winds did serious damage to plants weakened in this manner.

Stalk breakage of this type was especially severe where plant populations were above 20,000 per acre. Heavy nitrogen applications also helped to increase lodging.

This climatic condition also prevented cobs from developing correctly. Many of them split or shredded at harvest time, increasing harvest losses.

You can tell the two types of breakage apart by examining the part of the stalk where the break occurred. Stalk rot hits the plant at its base, and the stalk breakage occurred in the bottom two or three inches. On the other hand, stalks weakened by poorly developed supporting tissue broke over one to two feet above the ground.

This year's stalk breakage was not the fault of particular hybrids. While some differences did show up between hybrids, all hybrids showed severe damage from stalk breakage, including many that have had past records of excellent standability. The causes of stalk breakage were primarily due to climatic and cultural rather than genetic factors.

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January 2, 1962

No. 196

HISTORY OF THE CLAYPAN SOILS OF SOUTHERN ILLINOIS

Claypan soils dominate a large part of south-central Illinois. They are light colored and low in organic matter, and when unimproved they are very poorly drained. Since they are also low in plant foods, they naturally produce low yields. For many years most people believed that these soils could never produce as well as the dark soils dominating most of the corn belt.

However, many years ago Dr. Cyril G. Hopkins, then head of the Department of Agronomy at the University of Illinois, was confident that these soils could be made to produce profitably. He bought a farm in this area to demonstrate his ideas. At the same time he established experimental fields in the area that not only have confirmed his ideas, but have shown results far beyond his fondest hopes. This research carried on by the Agronomy Department of the University of Illinois for the past 40 years has furnished the material for demonstrating and teaching farmers of the area the proper practices to increase their production.

World War II furnished the incentive that brought about the renaissance of these claypan soils. Previously redtop seed had been the main crop produced on these soils, and this area was known as the redtop seed production center of the world. But during World War II farmers plowed up the redtop, planted soybeans, and sold them for \$4.00 a bushel. This crop provided the capital they needed to start them on the road from stones to riches.

Fortunately, both research data and the enthusiasm to use them were at hand. Farmers followed the findings of research and the teachings of area extension workers to effect a fabulous rehabilitation of the claypan soils. This was a feat that many had thought impossible. Here are some of the great changes that have occurred:

In 1961, corn yields from the eight experiment fields on these soils averaged 125 bushels an acre. Untreated land on the same fields, still like the old redtop land, yielded only 27 bushels an acre. The 125 bushels is more than 60 percent above the 1961 Illinois state average of 77 bushels an acre, which itself is an all-time record.

Extension men in the area tell us that the program is as simple as ABC. They point out the necessary steps as shown and demonstrated by research. The first requirement is a good cropping system, including legumes and grasses. In addition these soils require:

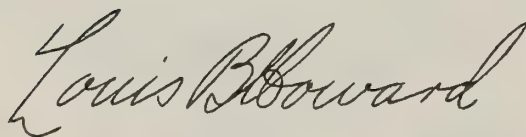
- A. Plenty of limestone to meet needs shown by soil tests.
- B. Potash in large applications, according to field results and soil tests.
- C. Phosphorus and nitrogen, according to tests, to reach top yields.

These steps combined with good seed, timeliness of operation, and weed, insect, and disease control have opened new yield horizons. Many farmers have demonstrated the soundness of this teaching. In 1960, Wolf Brothers in Jasper County weighed over the scale from their picker-sheller 124 bushels an acre from their entire acreage. They bought this land 15 years ago for \$30 an acre. Likewise, Joe Schmidt in Clay County has been producing more than 100 bushels of corn an acre for the past seven years. These are only two of the many farmers who are finding the ABC system profitable.

This ABC system was developed through the efforts of research workers and has been widely publicized by the extension branch of the Agronomy Department, University of Illinois, as part of its program of helping Illinois farmers to help themselves.

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A handwritten signature in cursive script that reads "Louis Bloward". The signature is written in dark ink and is positioned above the printed name and title.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

January 8, 1962

No. 197

BEWARE OF UNADAPTED CLOVER SEED (II)

Be particularly careful in buying your red clover seed this year. A recent issue of Agronomy News (No. 193) warned against planting Altaswede or Canadian mammoth red clover. Forage specialists now warn against English red clover seed that is moving into corn-belt seed channels.

English red clover is even worse for Illinois than Altaswede--which makes it bad indeed. It will not produce satisfactory growth for either plow-down or forage. In addition, it lacks the hairiness of native red clovers and therefore suffers severe insect damage.

Following are some corn-belt data from a number of English strains compared with certified Kenland:

	Tons per acre per year - two cuttings						La Grange Kentucky
	Madison, Wisconsin			Ames, Iowa			
	1952	1953	1954	1952	1953	1954	
Costwold	1.1	1.3	1.0	1.8	1.6	1.2	.5
Dorset Marl	1.1	1.9	1.6	1.9	1.5	1.1	.5
Essex	1.0	1.5	.8	1.8	1.8	1.2	.7
Suffolk	.9	1.1	1.0	1.8	1.3	1.2	.4
English Common	1.1	1.2	1.0	1.9	1.2	.9	.5
Certified Kenland	2.9	2.9	3.2	3.1	2.5	1.8	3.4

Note the poor performance of all these English clovers under corn-belt conditions. And some of these were their best breeding lines. These lines were also tested at Urbana, but the bugs ran away with the test. Illinois insects find these tender, hairless stems particularly appetizing.

The worst danger of both English clovers and Altaswede is that they will contaminate our red clover seed sources. Illinois medium red clover seed has been hard to beat over the years and has been in demand throughout the corn belt. If these unadapted types are widely planted in Illinois, they will cross with our own red clover and lower its yielding ability. Some will surely be left for seed, and then there will be farmers who buy "Illinois medium red" and find it performing like the English clovers in the table above. The net result will be a drop in both the quality and the reputation of Illinois medium red.

Red clover seed is in short supply this year. These unadapted types are moving in to satisfy those who want cheap seed. But this seed is cheap only at planting time. The growth available for plow-down or forage is what pays, and these clovers just don't have it.

(Continued)

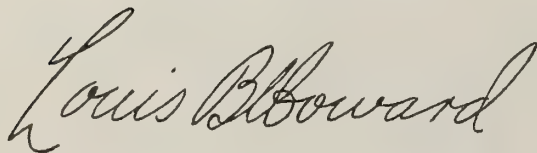
Corn-belt medium red clover seed may cost a little more, but you'll be more than repaid by what you get. Even better choices than medium red are available. In northern Illinois there will be good supplies of certified Lakeland red clover, the highest yielding variety ever available for this area. It has averaged nearly one-half ton more hay per acre than medium red over the past four years in northern Illinois trials. It is also resistant to mildew and northern anthracnose, two diseases that hit common medium red strains.

Southern Illinois farmers can buy certified Kenland. This variety has more regrowth than the common medium red types and has resistance to the southern anthracnose disease that hits red clover in that area.

You've heard the saying "Good seed doesn't cost, it pays." This is particularly true with red clover seed this year. And for English and Altaswede clovers we can also say that "Cheap seed won't pay, it will cost."

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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URBANA

February 19, 1962

THE FORAGE FACTS ROUND-UPS

No. 198

The Forage Facts Round-Ups are coming your way. Here's your chance to get the latest ideas for boosting profits from hay, pasture or silage whether you raise hogs, sheep, beef, or dairy cattle.

Specialists will present the latest information from five University of Illinois departments. A panel of local farmers will discuss how they use forages to make money.

No matter whether you grow and feed forage, or sell seed, silos, or machinery, there will be something here for you.

Lots of folks are coming. We hope you will too.

THE PLACES AND DATES

February 23--Illinois Wesleyan Memorial Center, Bloomington

February 26--Methodist Church, Effingham

February 27--Moose Lodge, Mt. Vernon

February 28--Dixon Springs Experiment Station, Robbs

March 1--Weinheimer Building, Highland

March 2--Middeldorf Auction House, Jacksonville

March 5--Farm Bureau Auditorium, Galesburg

March 6--4-H Center, Amboy

March 7--Masonic Temple, Freeport

March 8--Riley Grange Hall, Marengo

March 9--Grace Methodist Church, Joliet

THE TOPICS

What's New in the Hay Field--varieties, fertilization, and management

From Meadow to Mow--muscle or machine

New Ideas in Forage Feeding

How I Use Forage to Make Money--Panel of farmers

THE LATEST FORAGE INFORMATION

From these University of Illinois specialists:

W. D. Pardee, Crops

Wendell Bowers, Farm Machinery

G. R. Carlisle or H. G. Russell, Livestock

L. R. Fryman, Dairy

Plus your farm adviser and a panel of local farmers

THE SPONSOR

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Circle A DATE ON YOUR CALENDAR TODAY !

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February 26, 1962

No. 199

SOYBEAN VARIETIES RECOMMENDED FOR ILLINOIS, 1962

Here are this year's soybean recommendations for Illinois listed in order of maturity:

<u>Northern</u>	<u>Central</u>	<u>Southern</u>
Chippewa	Lindarin	Adams
Lindarin	Harosoy	Shelby
Harosoy	Hawkeye	Clark
Hawkeye	Adams	Kent
Adams	Shelby	
	Clark	

There are many factors to consider in selecting a soybean variety. They include standability, maturity, yield, insect and disease resistance, and resistance to shattering. Most important, of course, is ability to yield well from year to year and from county to county.

Long-term averages give the best information. Weather can affect varieties in different ways, and the best variety one year may be a second-rater the next. We cannot predict the weather. So don't plant a "one-shot" variety. Check its average over several years to make sure it will do the job.

The U. S. Regional Soybean Laboratory at Urbana has supplied the following long-term yield data for varieties grown in various sections of Illinois:

Variety	North Shabbona 6 years	North-Central Dwight 6 years	East-Central Urbana 6 years	West-Central Girard 5 years
Chippewa	41.5	35.6	37.7	
Lindarin	41.7	36.8	42.2	39.4
Harosoy	43.6	40.8	41.3	40.7
Hawkeye	39.8	37.2	39.2	39.3
Adams	42.8	41.9	42.2	40.4
Shelby			42.8	42.1
Clark			41.7	44.0

Variety	South-Central	Southern	
	Edgewood 4 years	Eldorado 5 years	Carbondale 4 years
Lindarin	40.4	33.4	28.7
Harosoy	40.6	33.7	28.3
Hawkeye	37.3	33.5	25.2
Adams	37.1	35.9	27.4
Shelby	40.5	40.6	29.1
Clark	41.9	43.7	30.0
Kent	44.7	47.3	34.5
Scott	38.6	43.1	30.9

Soybean varieties mature earlier as they are grown farther south. The U. S. Regional Soybean Laboratory reports the following average maturity dates for recommended varieties grown at test locations in Illinois for the six years 1956-1961.

Variety	Shabbona	Dwight	Urbana	Girard	Edgewood	Eldorado
Chippewa	9-11	9-13	8-31	--	--	--
Lindarin	9-21	9-21	9-9	9-6	9-9	9-1
Harosoy	9-22	9-22	9-8	9-5	9-8	9-1
Hawkeye	9-24	9-24	9-11	9-9	9-10	9-3
Adams	9-28	9-26	9-13	9-11	9-11	9-5
Shelby	10-1	9-29	9-19	9-16	9-17	9-10
Clark	--	--	9-25	9-23	9-24	9-18
Kent	--	--	--	--	10-1	9-27
Planting date	5-17	5-30	5-19	5-21	5-30	5-22

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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URBANA

March 5, 1962

No. 200

1962 CROP VARIETIES RECOMMENDED FOR SPRING PLANTING IN ILLINOIS

Are you planting the best available crop varieties--or merely looking for "cheap" seed? Varieties recommended for your area by Illinois agronomists are carefully selected to give top performance. A few dollars extra for a recommended variety at planting time can be your best investment of the year. "Cheap seed" can be your biggest gamble.

University recommendations depend on precise testing at many locations in the state. Varieties are tested for several years to be sure they are reliable.

To be recommended, a variety must measure up in many characteristics. It must be high-yielding, of course, but it must also have standability, disease and insect resistance, and the right maturity. And it must be dependable year in and year out and from county to county.

No variety can be perfect in all categories, but the varieties recommended for Illinois are those that come closest. Here's an at-a-glance summary of currently recommended crop varieties for spring planting in Illinois:

<u>Oats</u>	<u>Northern Illinois</u>	<u>Central Illinois</u>	<u>Southern Illinois</u>
	Beedee	Clintland 60	Minhafer
	Clintland 60	Clintland	Newton
	Clintland	Goodfield	Putnam 61
	Dodge	Minhafer	
	Garry	Newton	
	Goodfield	Putnam 61	
	Minhafer		
	Newton		
	Shield		
<u>Soybeans</u>	Chippewa	Lindarin	Adams
	Lindarin	Harosoy	Shelby
	Harosoy	Hawkeye	Clark
	Hawkeye	Adams	Kent
	Adams	Shelby	
		Clark	
<u>Red Clover</u>	Lakeland	Kenland	Kenland
	Dollard	Illinois Common	Illinois Common
	Illinois Common		

Alfalfa

Fast-growing varieties for top yield in short rotations

- a. DuPuits
- b. Alfa

Wilt-resistant varieties for short or long rotations

- a. Buffalo
- b. Vernal
- c. Ranger

Spring Barley--northern Illinois only

For malting

- a. Kindred
- b. Traill

For feed

- a. Liberty
- b. Forrest

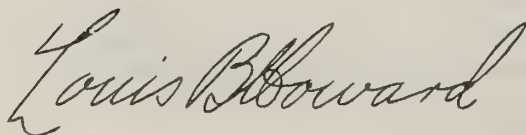
The pace of change continues to quicken and nowhere is it faster than in crop varieties. Imaginative, productive plant breeders continually seek more dependable varieties to help take the gamble out of farming. So check the variety you are planting. If it is the same one you planted 10 years ago, it is probably obsolete and costing you money. If you were planting it five years ago, probably a new variety will do a better job.

To be sure you get what you pay for, use certified seed. It is available for nearly all recommended varieties. Certified seed will give you top value for your seed dollar. Buy your seed from a reputable seed dealer whom you know and can trust. "Fly-by-night operators" sell more sorrow than good seed.

Drill-box surveys show that many farmers plant home-grown seed or buy their seed from their neighbors. These same surveys show that this seed is often high in weed seeds and low in germination. Good seed pays off. "Cheap" seed doesn't pay--it costs.

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CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

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March 23, 1962

No. 201

SEEDINGS FOR DIVERTED ACRES

If you have diverted some of your cropland from production under government programs, you have the opportunity to establish the best forage seedings you have ever had. Use 1962 to establish the seedings, and then go all out for five tons of forage per acre in 1963.

The 1962 program regulations require that all diverted acreage be devoted to approved conservation uses.

If you produce livestock of any kind, it makes good sense to use these diverted acres to establish high-yielding forage crops for the future.

What can you seed? First choice among forages is alfalfa. In 1961 Illinois farmers seeded almost as much alfalfa as all other legumes put together. Alfalfa has no equal for sustained high production of quality forage.

New improved varieties of alfalfa are available. DuPuits and Alfa will give top production for early cutting for the two harvest years after they're established. Wilt-resistant Vernal and Buffalo are best for long-term stands or for fields that cannot be harvested by June 7. You may also use Ranger for long-term stands, but it has a somewhat lower yield and is more susceptible to leaf disease than newer varieties. Common alfalfas are susceptible to bacterial wilt, so they are not suited for long rotations. And they fall far below DuPuits and Alfa in yield in short rotations.

For highest grazing yields, try the early-maturing DuPuits and Alfa in mixtures with orchardgrass. Seed Vernal, Buffalo, and Ranger with timothy or brome grass for either hay or pasture.

Perhaps you aren't interested in forage crops but want a plow-down crop. Several choices are available. For fall plow-down, a non-hardy alfalfa may do the trick. Moapa, a new African type variety, will produce excellent summer and late fall growth. Other non-hardy types, such as African, Chilean and California common, are also acceptable.

If you would like a choice of fall or spring plowing, fast-growing winter-hardy varieties like DuPuits and Alfa will provide as much fall growth and will produce much added green manure in the spring.

Sweet clover and medium red clover also make good plow-down crops. Mammoth clovers produce less for fall plow-down but will provide growth for spring plowing. Plant medium red clover if you plan to fall-plow or want the later alternative of using the crop for hay or pasture.

If you're planting clover, check your seed sources. Atlaswede or Canadian mammoth and English clovers are not adapted to Illinois conditions and should not be used.

You cannot harvest a crop on diverted acres, so be "stingy" with the nurse crop. Use less than a bushel of oats per acre to lessen competition for moisture and nutrients. Clip oats in the boot stage and again later if necessary. You will be surprised at how good your seedings will look compared with those you usually get in your grain crops.

Or, best of all, don't use any companion crop. Clip weeds late in June. Why add oats that won't be harvested? They will just add to the competition with the seeding.

Two chemicals--2,4-DB and Dowpon or dalapon--effectively control weeds in seedings. However, they cannot be used on forages that are to be harvested the same year. Since you can't harvest forage on diverted acres anyway, it is possible to control weeds with these chemicals.

For broadleaf weeds, apply one pound of 2,4-DB amine (note, not 2,4-D) or one-half pound of 2,4-DB ester before the weeds are six inches tall. For grassy weeds, use three pounds of Dowpon per acre before the grass is four inches tall. However, do not use Dowpon if you have grass in your seeding mixture. The chemical will kill desirable as well as weedy grasses. For both grasses and broadleaf weeds, use two and one-half pounds of Dowpon together with 2,4-DB at the rates above.

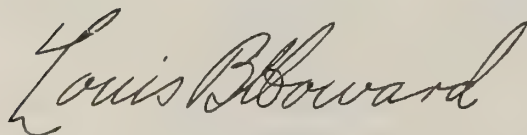
Remember, if you use these chemicals you cannot harvest or pasture forage this year. Just clip it and let it lie. These chemicals come through in the milk or are deposited in animal fat. They may not be harmful even there, but they have not been cleared by the Pure Food and Drug Administration and have zero tolerances in meat and milk.

Both chemicals will be broken down in the soil by next year, and the forage will be safe to use at that time. These chemicals are suggested only for fields entered as diverted acres from which no crop can be harvested.

Since diverted acres must be seeded, plan your seedings to supply your coming forage needs. Don't buy seed just because it is cheap. Buy high-quality seed of improved varieties to take advantage of modern plant breeding and seed technology. There is profit in the bag of good seed. The bag of cheap seed often contains disappointment.

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CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

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March 26, 1962

No. 202

SPRING BARLEY RECOMMENDATIONS FOR 1962

Spring barley is recommended only for northern Illinois, where spring growing conditions are usually cool and moist. However, it can be grown successfully as far south as Champaign County, depending on the season.

Two kinds of spring barley can be grown in Illinois, one for malting and the other for feed. It makes sense to choose a malting variety where possible even though weather conditions will sometimes keep your crop from reaching malting quality. A malting barley with good qualities usually receives a worthwhile premium.

Malting barley also makes good feed. If the price of malting barley is high, a farmer can sell his malting barley and buy feed barley, or he can keep enough of the malting crop for feed.

To get the malting barley premium, your crop must have:

1. High germination. High germination yields more malt.
2. Uniform ripeness. Don't harvest green patches with the ripe crop.
3. Test weight. The test weight per bushel must be 43 pounds or more.
4. Soundness. Soundness is important and the grain must be 90 percent sound. Avoid damaging the grain when combining. Check the combine's adjustment several times during combining.
5. Disease. Disease-damaged kernels can prevent the barley from reaching malting standards.

The following procedure at harvest time is most likely to produce barley to meet required malting standards: Don't harvest until the straw is completely yellow and the kernels are hard. Be sure the grain moisture is down to 14 percent before combining. Adjust speed of cylinders and set of concaves to prevent cracking and skinning of kernels. Skinned and broken kernels in malting barley can't exceed 1 percent. Clean storage bins thoroughly and make them rodent and bird proof. Foreign material can't exceed 3 percent.

Growing spring barley can be risky. Hazards include hot, dry weather, chinch bugs, and scab disease. Seed early to avoid hot weather injury. Chinch bugs can sometimes cause trouble.

When the scab disease attacks early, it stops the development of the grain, producing a mummified kernel that will not germinate. Scab is caused by Gibberella aubineti, a cereal fungus. If barley is planted on ground that was previously in corn, the disease can be reduced by plowing under ALL the cornstalks. A scab-affected crop should not be fed to hogs, and it is not accepted for malting purposes.

If you have acres diverted under government feed grains or wheat programs, check with your local A.S.C. committee before expanding your barley acreage. In these programs barley is considered a feed grain, and cross-compliance is called for. But an exception is made for malting barley that is worth checking on.

To sum up, if you plan to grow spring barley, plant early and use a recommended variety. And, for best returns, plant a malting type.

The following summary compares the yields, test weights, and lodging percentages of spring barley varieties in 1961 at Shabbona (DeKalb County) and Urbana. The first four varieties listed are recommended for Illinois. The varieties with "M" are malting barleys; those with "F" are feed barleys.

Variety		Shabbona research center results				Urbana south farm test results			
		Yield, bu./A		Test weight	% of lodging	Yield, bu./A		Test weight	% of lodging
		1961	1957-61			1961	1956-61		
Kindred	M	87	57	46	60	48	52	45	97
Traill	M	102	64	47	00	62	61	46	73
Liberty	F	92	62	47	10	63	62	45	37
Forrest	F	85	57	47	70	53	53	46	18
Moore	F	92	62	44	00	53	54	44	2
Oderbrucker	M	77	51	44	90	52	50	44	83
Parkland	M	--	--	--	--	63	60	46	37

Here are the ways in which spring barleys react to several diseases commonly found in Illinois. (Notice varieties' reaction to scab!)

Variety		Rust		Smut		Scab	Septoria	Mildew
		Stem	Leaf	Loose	Covered			
Kindred	M	R	MS	MS	MS	S	S	MS
Traill	M	R	S	MS	MS	S	SS	MS
Liberty	F	R	S	S	MS	S	S	R
Forrest	F	R	MS	S	MS	S	S	S
Moore	F	MR	MR	S	S	S	MR	MR
Oderbrucker	M	S	S	S	S	S	MR	S
Montcalm	M	S	S	R-S	MS	S	S	S
Parkland	M	S	S	S	S	S	S	S

S--susceptible; R--resistant; MS--moderately susceptible; MR--moderately resistant.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

March 30, 1962

No. 203

SPRING TREATMENTS FOR QUACKGRASS CONTROL

Quackgrass is a serious perennial weed found in northern Illinois, particularly in the northern two or three tiers of counties. Although it produces a great amount of seed, it seems to spread primarily from the underground rootstocks (rhizomes). The rhizomes are spread by plowing and cultivating, and each year the patches in the fields seem to grow larger. Quackgrass spreads from farm to farm by seed, however, and new infestations on farms that never had quackgrass may come from planting grain that contained quackgrass seeds.

Rotations are seldom effective in eliminating quackgrass. To get effective control with cultivation, the ground should be cultivated several times during the summer in such a way as to leave the rhizomes on the surface to dry out, and no crop should be grown. In recent years a series of new chemicals have been used to kill quackgrass.

Research work done primarily at the University of Wisconsin has shown atrazine to be very effective for controlling quackgrass, and work done in northern Illinois has confirmed its effectiveness.

Since the rates of atrazine recommended for controlling quackgrass are relatively high, residues of the chemical in the soil could damage other crops, such as oats or soybeans, the year after treatment. For this reason, where the higher rates (4 pounds active) are used, only corn should be planted for two consecutive years. Amitrole-T may be used in combination with a lower rate of atrazine in order to allow small grain to be seeded the year after corn instead of having two years of corn. Dalapon is one of the older alternative treatments that is still recommended.

Any one of the alternative methods summarized below may be used for spring treatment of quackgrass:

Chemical

1. Atrazine Apply 4 lb. atrazine (5 lb. 8CW) in 20 to 30 gal. water per acre when quackgrass is actively growing, at least three weeks before plowing. Plant corn for two consecutive years.
2. Atrazine split application Apply 2 lb. atrazine (2 1/2 lb. 8CW) in 20 to 30 gal. water per acre when quackgrass is actively growing, at least three weeks before plowing. Apply an additional 2 lb. of atrazine (2 1/2 lb. 8CW) as broadcast pre-emergence at planting time. Plant corn for two consecutive years.
3. Amitrole-T plus atrazine Apply 2 lb. (1 gal.) amitrole-T in 20 to 30 gal. water per acre when quackgrass is 4 to 6 inches high. Wait 10 to 14 days and plow. Plant corn as soon as possible, using 3 lb. rate of atrazine as pre-emergence. With this treatment small grain may be planted the following year.
4. Dalapon Apply 6 to 8 lb. of dalapon in 30 to 40 gal. water in spring when quackgrass is 6 to 10 inches high before planting corn or soybeans. Plow 7 to 10 days later. Wait three or four weeks before planting corn or soybeans.

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AGRONOMY

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NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 6, 1962

PERFORMANCE OF COMMERCIAL CORN HYBRIDS IN ILLINOIS, 1961

No. 204

The tables below present data from commercial hybrid corn trials conducted by the Department of Agronomy. Figures represent the average results for the three years 1959, 1960, and 1961. Further information is given in Bulletin 682, entitled "Performance of Commercial Corn Hybrids in Illinois, 1961," which can be obtained from the Information Office, 112 Mumford Hall, University of Illinois Urbana, Illinois.

Seed samples were collected by representatives of the University directly from the warehouses and seed supplies of producers entering the test. Tests were planted and harvested by machine to correspond as closely as possible with actual farm methods.

When considering a hybrid, remember that, while yield is important, so are maturity (indicated by percentage moisture at harvest) and standability. Check all three before making decisions.

Table 1.--Extreme Northern Illinois: Woodstock

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
Summary: 1959-1961			
Moews 500A	100	25.2	62
DeKalb 400	99	24.3	53
Moews 48A	95	24.4	75
Hulting 242	95	22.8	72
Pioneer 371	94	20.8	67
P.A.G. 305	92	24.6	69
Cornelius 404B	91	23.2	66
Hulting 238	91	23.8	54
Moews 14E	91	24.2	62
DeKalb 440	90	24.5	72
Pioneer 354	89	23.7	57
DeKalb 444	89	25.1	74
Cargill 180	88	24.0	52
P.A.G. 62	88	21.9	54
DeKalb 414	88	23.7	66
P.A.G. 234	85	23.7	65
Average of all entries	92	23.7	65

Table 2.--Northern Illinois: DeKalb

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
Summary: 1959-1961			
Northrup King KT628	119	28.0	83
P.A.G. Exp. 15018	116	25.0	77
Hulting 260SC	114	26.1	74
Pioneer 329	113	25.3	83
Hulting 242	112	24.4	91
Moews 48A	112	25.2	88
Wyffels W-600	112	26.7	91
Sieben S-440E	112	25.4	79
P.A.G. 305	112	25.6	86
DeKalb 633	111	28.0	86
DeKalb A506	110	26.4	87
Moews 500A	110	27.8	77
Moews CB65A	110	26.4	82
Troyer L13	109	26.6	89
Monier 6M-6	109	26.7	83
DeKalb 414	109	24.0	88
Sieben S-580	108	26.5	88
DeKalb 640	108	28.5	91
Pioneer 371	108	21.6	84
Frey 410	108	25.0	91
Troyer M18	106	25.6	87
Moews 505A	105	25.0	85
Sieben S-560	105	25.1	80
Troyer M11T	105	27.7	88
Wyffels W-495	104	25.7	90
Troyer M12T	104	27.7	91
Hulting 238	104	23.7	70
Wyckoff's W-25A	103	26.9	69
Sieben S-360	103	27.1	85
Sieben S-340	102	24.8	79
Sieben S-440	102	26.6	89
Super-Crost 440	102	26.1	71
P.A.G. 234	102	24.3	81
Wyckoff's W-20	102	26.8	85
DeKalb 444	99	26.3	87
Pioneer 345	99	24.5	83
Hulting 481	99	25.9	74
DeKalb 459	97	24.7	61
Cargill 256	97	24.9	81
Average of all entries	107	25.8	83

Table 3.--West North-Central Illinois: Galesburg

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
Summary: 1959-1961			
DeKalb 805	133	23.2	94
Bear Unicorn X600	131	22.7	86
Pioneer 321	127	24.0	85
Van Horn V.H.101	124	23.8	79
P.A.G. SX14	123	23.2	95
Whisnand 852	123	24.5	87
McAllister IVX1001A	122	21.5	94
Bear OK96A	122	24.8	82
Null N-83	122	23.4	87
Morton M-505	122	21.9	92
Moews 524	122	23.8	85
Forster 44	121	24.0	87
Bear OK878	120	22.8	84
Forster 33	120	24.7	87
Tiemann T-78	119	23.0	77
Pioneer 319	118	22.6	84
Troyer M17T	117	23.3	90
Schwenk S34	117	21.9	85
McAllister 13A	117	23.4	88
P.A.G. 415	117	23.2	81
DeKalb 633	116	23.0	86
Pioneer 316	116	22.7	87
Moews 524A	115	24.5	83
DeKalb 640	115	23.1	91
Tiemann T-68	114	21.3	79
Frey F57	114	23.0	90
Forster 25	114	23.4	91
Hulting 2608C	113	22.1	85
Stewart S-65	113	22.4	86
DeKalb 812	113	24.3	90
Whisnand 830	113	22.9	83
Forster 56	112	24.4	86
Monier 6-M-6	111	23.0	84
Ainsworth X-97	111	23.4	93
P.A.G. 418	111	23.9	77
Troyer M11T	109	22.8	89
Northrup King KT628	109	23.4	88
Cargill 310	109	22.6	90
Pioneer 329	109	20.4	88
Hulting 482	108	22.4	89
Prairie Gold (Dittmer) D-791	103	21.4	91
Sieben S-340	101	21.5	79
Hulting 481	98	22.9	86
Hulting 242	97	21.9	89
Sieben S-360	96	22.2	75
Average of all entries	115	23.0	86

Table 4.--East North-Central Illinois: Ashkum

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
Summary: 1959-1961			
DeKalb 632	102	23.2	78
DeKalb X82-030	100	22.5	76
Crib Filler 77	99	22.8	76
Van Horn V.H.97	98	21.4	82
DeKalb 805	98	21.6	82
Bear OK96A	97	22.5	71
Moews CB96A	96	21.6	83
Frey 892	96	21.1	77
Troyer L13	95	20.2	77
Pioneer 321	95	22.4	78
Moews 524A	95	23.0	84
Trisler T-35B	95	22.0	83

Bear OK55	95	22.0
Bear Unicorn X600	93	20.6
Troyer M13T	93	21.5
Troyer M11T	92	22.6
Trisler T-32B	92	22.0
Crib Filler 131	91	22.9
Hulting 2608C	91	21.5
Bear OK96	90	22.8
Wyckoff's W-25A	90	22.0
DeKalb 803A	90	23.2
Hulting 482	90	21.2
Tiemann T-68	89	20.5
Frey 692	89	21.3
Troyer L14T	89	20.3
Troyer M18	87	21.9
Wyckoff's W-20	84	22.0
Average of all entries	93	21.9

Table 5.--East-Central Illinois: Urbana

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
Summary: 1959-1961			
DeKalb 805	125	22.4	7
Whisnand 852	120	24.7	3
Bear Unicorn X600	119	23.2	2
Bear OK878	119	23.3	5
Bear Unicorn X606	119	24.5	1
Stiegelmeier Hi-B-Jack S-600	118	22.7	7
Appl A-159	116	24.1	9
Stiegelmeier Hi-B-Jack S-396	114	24.3	2
Moews 524A	114	24.0	6
Illinois 1996 (Pfeifer)	113	23.2	2
Pioneer 321	113	24.2	5
Pioneer 319	113	22.1	6
Super-Crost 851	111	24.3	0
P.A.G. 418	111	24.4	3
Tiemann T-72	111	22.6	2
Bear OK96A	111	24.0	6
Van Horn V.H.111	110	22.8	3
P.A.G. 444	109	27.3	5
Trisler T-35B	109	24.3	8
Crib Filler 77	108	24.5	5
Canterbury 400	108	21.7	0
Monier 6-M-6	108	23.4	0
Ainsworth X-14-3	107	22.9	46
Canterbury 420	107	22.2	0
Crib Filler 131	107	23.7	1
Appl A-400	107	23.1	5
Frey 892	107	23.0	0
Bear OK96	107	24.5	1
Illinois 1421 (Pfeifer)	107	22.4	39
Appl A-130	106	22.1	36
Whisnand 830	106	23.2	10
Moews 523	106	23.5	1
Troyer M11T	106	23.5	1
Pioneer 312A	106	25.6	12
Moews CB96A	106	22.9	18
Troyer L13	105	22.6	1
Frey 692	105	23.1	3
Trisler T-32B	104	22.3	38
Ainsworth X-98	102	23.2	3
DeKalb 803A	102	24.9	38
Crib Filler 124	102	23.0	88
Pioneer 309A	101	28.3	3
Trisler T-19B	99	20.5	89
AES 805	99	23.5	95
Todd 635	99	22.8	89
Trisler T-33B	95	21.5	87
Troyer L14T	94	23.9	93
Average of all entries	108	23.5	90

Table 6.--West South-Central Illinois: Greenfield

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
<u>Summary: 1959-1961</u>			
DeKalb 805	108	20.0	78
Bear Unicorn X606	103	21.3	74
Moews 524	102	19.5	77
Pioneer 321	102	20.6	76
Bear OK878	102	20.2	80
DeKalb 640	100	19.3	84
Bear OK96	97	20.8	74
Moews CB69A	97	19.4	83
Pioneer 312A	96	22.0	78
Canterbury 420	96	17.7	71
Pioneer 302	95	21.4	75
Whisnand 830	94	19.7	81
Princeton 685	94	19.7	81
Ainsworth X-100	94	21.1	81
Whisnand 852	92	21.0	70
Canterbury 400	91	17.9	82
Pioneer 316	91	19.1	77
Van Horn V.H.111	91	19.1	64
Whisnand 834	91	19.7	84
Cargill 320	90	19.5	77
Pioneer 319	90	18.8	70
Pioneer 309B	89	24.9	85
Moews CB96A	88	19.1	81
Ainsworth X-98	85	19.8	81
Average of all entries	95	20.1	78

Table 7.--West-Central Illinois: Bowen

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
<u>Summary: 1959-1961</u>			
Bear Unicorn X600	121	22.4	88
Pioneer 321	109	23.1	90
Whisnand 852	108	24.4	85
DeKalb 633	105	23.5	93
Prairie Gold (Dittmer) D-896	105	23.3	94
Moews CB96A	103	22.6	91
Cargill 340(5741)	102	22.7	90
McAllister 13A	102	22.6	88
Moews 524	102	23.4	93
Canterbury 420	101	22.2	86
Plymouth P-97	100	21.9	94
Pioneer 6117	100	23.3	97
Bear OK69	100	24.6	88
DeKalb 805	100	22.8	91
Whisnand 482	98	24.3	95
DeKalb 803A	98	26.3	88
Ainsworth X-14-3	97	23.3	88
Porton M-12A	97	23.5	94
Canterbury 400	97	21.2	87
Prairie Gold (Dittmer) D-837	96	22.4	93
Troyer M11T	96	23.8	89
P.A.G. 444	95	26.3	89
Pioneer 312A	95	26.3	94
Whisnand 830	93	23.5	91
Troyer M13T	93	22.0	90
Porton M-404	90	22.7	96
Prairie Gold (Dittmer) D-821	89	22.5	86
Troyer M17T	87	26.5	95
Average of all entries	99	23.5	100

Table 8.--Central Illinois: Stanford

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
<u>Summary: 1959-1961</u>			
DeKalb 805	130	21.3	97
P.A.G. SX14	126	22.3	99
Pioneer 309A	124	26.9	96
Pioneer 302	122	24.6	93
Pioneer 321	121	22.1	95
Illinois 1996 ('59-'60, Station; '61, Stone)	120	21.5	93
DeKalb X82-030	118	21.3	90
Whisnand 852	118	22.6	92
Stiegelmeier Hi-B-Jack S-396	118	22.4	96
DeKalb 633	118	21.9	95
Moews CB90A	118	22.5	96
P.A.G. 444	117	22.8	92
Moews CB69A	117	21.8	97
Bear OK96A	117	21.7	89
Frey F57	117	20.2	95
Stiegelmeier Hi-B-Jack S-600	116	22.1	92
DeKalb 640	116	20.0	96
Stiegelmeier Hi-B-Jack S-300A	116	22.3	94
Monier 6-M-6	115	21.3	95
Pioneer 309B	115	28.9	96
Pioneer 329	114	19.9	96
Whisnand 830	114	22.0	93
Bear Unicorn X600	114	20.3	86
DeKalb 837	113	22.6	83
Bear Unicorn X606	113	23.4	94
Tomco 838	113	22.4	95
Todd 635	112	21.3	95
Mountjoy M-100	112	21.7	91
Moews 524	112	21.9	96
Frey 892	112	19.7	93
Trisler T-35B	111	21.0	94
Moews CB96A	110	20.9	94
Ainsworth X-14-3	107	21.2	88
P.A.G. 418	107	21.9	88
Canterbury 420	107	20.1	95
Todd 840	106	22.7	91
Mountjoy M-444	106	21.4	96
DeKalb 803A	105	23.3	90
Trisler T-32B	104	21.2	96
Troyer L14T	104	21.5	95
Troyer L13	104	20.9	94
Ainsworth X-98	103	20.7	93
Troyer M11T	103	21.5	92
Trisler T-19B	102	20.8	90
Canterbury 400	98	19.6	93
Average of all entries	113	21.9	93

Table 9.--Southern Illinois: Brownstown

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
<u>Summary: 1959 and 1961</u>			
DeKalb 925(W)	119	24.8	88
Pioneer 309B	112	31.1	95
Stull's 100Y	107	23.5	94
P.A.G. 631W	106	26.6	93
Bear OK96A	104	23.5	92
Stull's 101Y	103	22.9	94
Pioneer 321	102	23.0	93
Bear Unicorn X600	99	23.3	96

Table 9.--Southern Illinois: Brownstown (Cont.)

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plants %
Pioneer 309A	99	28.9	97
Ainsworth Goldline 378	98	23.0	90
Canterbury 420	97	21.8	92
Ainsworth X-100	97	24.9	98
Canterbury 400	96	22.5	92
Pioneer 319	96	21.9	95
Pioneer 302	94	25.5	89
Pioneer 312A	94	25.7	96
Van Horn V.H.76	94	22.3	89
Moews 525	93	25.5	96
DeKalb 803A	93	25.1	92
Moews 523	92	22.5	92
Bear OK69	92	22.7	94
Bear OK878	90	22.7	95
Princeton 685	90	23.2	97
Moews CB70A	90	22.1	94
Tiemann T-72	89	22.4	95
P.A.G. 434	88	24.2	92
Moews CB96A	88	21.7	94
Crib Filler 124	87	22.2	96
Tiemann T-78	86	22.0	88
Princeton 890	83	24.4	92
Princeton 888	82	22.7	92
Crib Filler 131	80	23.3	91
Average of all entries	95	23.8	93

Table 10.--Extreme Southern Illinois:
Dixon Springs, 1961; Wolf Lake, 1959-1960

Entry	Total acre yield bu.	Moisture in grain at harvest %	Erect plant %
Pioneer 309B	95	24.8	97
Whisnand 830	93	19.6	95
DeKalb 925(W)	93	21.8	90
Pioneer 309A	93	22.5	99
Schenk S-90W	92	22.4	94
Stull's 400W	92	21.4	86
Whisnand 852	91	20.7	95
Pioneer 302	90	21.4	95
DeKalb X82-029	89	20.9	76
Pioneer 319	89	19.0	92
Princeton 890	89	21.3	86
DeKalb 805	88	20.8	94
DeKalb 1023	87	23.8	69
Princeton 685	86	21.0	94
Ainsworth X-100	85	20.6	95
P.A.G. 631W	85	21.6	93
Princeton 888	85	20.1	85
Moews CB96A	83	19.5	94
Ainsworth X-14-A	80	20.3	79
Average of all entries	88	21.2	90

Summary: 1959-1961

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CROPS AND SOILS

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COLLEGE OF AGRICULTURE

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April 27, 1962

No. 205

PRE-EMERGENCE HERBICIDES FOR 1962

Pre-emergence herbicides are weed-killing chemicals that are applied before the crop or weeds emerge. Agronomists recommend them primarily for serious weed problems that cannot be handled by ordinary cultural practices, such as rotary hoeing and cultivation, and by post-emergence applications of 2,4-D. Applying pre-emergence herbicides over the row in a 12- to 14-inch band at planting time with equipment mounted on the planter will reduce costs. The following table lists chemicals recommended for 1962 and amounts to apply:

Crop	Pre-emergence herbicide	Amount to apply per acre in 12- to 14-inch band		Weeds controlled
		Liquid ^{1/}	Granular	
Corn	Randox	1 1/3 qt.	7 lb. (20% a.i.) ^{3/}	Annual grasses
	Atrazine	5/6 to 1 1/4 lb.	6 2/3 to 10 lb., (10% a.i.)	Annual grasses and broadleaves
	2,4-D ester	1/2 lb. ^{2/}	3 1/2 lb. (20% a.i.)	Annual grasses and broadleaves
	Randox-T	1 1/2 qt.	10 lb. (35% a.i.)	Annual grasses and broadleaves
	Eptam	2/3 qt.	20 lb. (5% a.i.)	Johnsongrass and wild cane from seed
Soybeans	Randox	1 1/3 qt.	7 lb. (20% a.i.)	Annual grasses
	Amiben	2 qt.	Granules not available commercially	Annual grasses and broadleaves
	Alanap	2/3 gal.	14 lb. (10% a.i.)	Annual grasses and broadleaves
	Sodium FCP	See label for amount to apply		Controls broad- leaved weeds better than it does grasses

^{1/} For band spraying, use the indicated amount of herbicide in 7 to 10 gallons of water per acre.

^{2/} Actual amount of active ingredient (2,4-D acid).

^{3/} a.i. stands for active ingredient. The amount listed is for material with the indicated percent of active ingredient.

Randox may be used on either corn or soybeans. Both crops have good tolerance to it. It has a definite place where annual grasses like foxtails are serious. For successful control, about half an inch of rain is needed within a week or 10 days after treatment. Use precautions to avoid irritation to skin and eyes from Randox. Granules will help reduce irritation but will not eliminate it.

Atrazine controls both annual grass and broadleaved weeds. Corn has very good tolerance to it. It requires a little more rainfall than the more soluble materials, but heavy rainfall will not destroy its effectiveness. It has a long enough residual to control weeds throughout most of the season. Use the lower rate for lighter soils and the higher rate for darker soils. Applying no more than the recommended amount will help to prevent residue problems.

2,4-D ester (not amine) controls annual grasses as well as broadleaved weeds if sufficient rain falls within a few days to a week after application. Some damage to corn may occur, especially if heavy rains follow treatment. Although its cost is relatively low, 2,4-D is less likely to control weeds than either Radox or Atrazine.

Radox-T is Radox with an additive that improves control of broadleaved weeds but also increases the chance of crop injury. Do not use Radox-T on soybeans. Use the same precautions in handling as with Radox.

Eptam is recommended for controlling seedlings of Johnsongrass and wild cane in areas where these weeds are a problem. Incorporate it into the top inch of soil. This chemical sometimes injures corn, but the injury is usually not significant compared with the damage caused by Johnsongrass and wild cane.

Amiben now has label clearance for use on soybeans. Field results for the past three years indicate good control of both annual grasses and broadleaved weeds and good crop tolerance. The granular form will not be commercially available in 1962.

Alanap may be used where annual grasses and broadleaved weeds (except smartweed) are expected to be serious in soybeans. Alanap sometimes injures soybeans, especially if rainfall is heavy. Both granular and liquid forms will be available.

Sodium PCP now has label clearance for use on soybeans. It controls broadleaved weeds better than grasses. It is more effective on light than on dark soils. Some injury to soybeans may occur. Use precautions in handling because this material can cause irritation.

For further information request Circular 843, "Chemical Weed Control for Illinois--1962," from the College of Agriculture, University of Illinois, Urbana, Illinois.

To protect the user, the crop, and the consumer--always follow label directions.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 30, 1962

No. 206

GRANULAR VS. LIQUID FORMS OF PRE-EMERGENCE HERBICIDES

Most pre-emergence herbicides may be applied either as sprays or in dry granular form.

This year Radox, Radox-T, 2,4-D, Amiben, Alanap, and dinitro--DNBP--are available as liquid concentrates that are diluted with water for spray application. With the exception of Amiben, these same materials are also available in granular form. Granular Amiben will probably not be available commercially until 1963. Most granular materials are made by impregnating clay granules with the weed-killing chemical. Atrazine is an exception; ammonium sulfate is used here instead of clay.

To apply Atrazine as a spray, mix wettable powder with water. Be sure that sprayer screens and nozzle tips are large enough. Fifty-mesh screens or larger are recommended. Be sure to keep the material agitated.

Sodium PCP for soybeans will be available this year as a beaded material that may be applied either as granules or mixed with water for spray application. Liquid and powder forms of sodium PCP for mixing with water may also be available.

Current research indicates that liquid and granular forms are about equally effective when recommended rates are properly applied. Atrazine is a possible exception. Last year the wettable powder form of Atrazine appeared to perform better at some locations than the 20 percent granules. This year Atrazine will be available as a 10 percent granular material, which is preferable to the 20 percent.

Since most pre-emergence materials seem to perform about equally well in either form, it is up to you to decide which you prefer. Granules cost more than materials for spray application. The difference averaged about 60 cents an acre. But you might be willing to pay this extra cost because the use of granules eliminates the need for hauling water.

The water applied in a spray merely serves as a carrier for the chemical. It does not move the chemical into the soil. About 15,000 gallons of water an acre are needed to move the chemical into the soil. Rainfall must do this job.

During the past few years, machinery manufacturers have improved the equipment for applying granules. When properly adjusted, most granular applicators do a satisfactory job. However, they are often not so easy to calibrate as sprayers and need checking more often.

Sprays may have some advantage where soil surfaces are uneven and rough. Here granules tend to roll and do not "stay put" as well as materials applied in a spray.

With materials that are irritating to handle--Radox, Radox-T, sodium PCP, and dinitro--the granular form will help to reduce but not completely eliminate the irritation problem.

Decide which form to use. Before you apply the chemical, read the label so that you clearly understand the directions. Then follow those directions carefully.

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NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 7, 1962

CORN IS NOT A PROFITABLE GREEN MANURE CROP

No. 207

Many Illinois farmers have been asking whether corn will pay as a green manure crop on acres diverted from production of wheat or feed grains under government programs. Corn can produce up to seven tons of dry matter to be plowed down per acre. This practice may be of value to those farmers who have soils that are seriously deficient in organic matter. However, recent Illinois tests in which corn was plowed down for green manure show that:

1. The practice did not increase later corn yields except where two crops were plowed down.
2. Farmers lost a year's harvest and its cash return.
3. A green manure corn crop cost more to produce than oats plus a legume catch crop.
4. Even when two successive corn crops were plowed down, the increase in yield was no better than that from oats seeded with a clover—alfalfa catch crop.

From an economic standpoint, the practice looks even worse. In the University of Illinois studies, commercial fertilizer including 100 to 300 pounds of nitrogen was applied per acre to the corn crops grown for green manure. The oats with an alfalfa—red clover catch crop received no fertilizer, but yet this treatment was just as effective in increasing corn yields the following year. Plowed-down corn cost more to produce and did not yield a crop suitable to sell. Test results tell the story.

Green Manure Effects of 1960 Treatments on 1961 Corn Yields

1960 treatment	1961 yield Bu./A.
1. Regular corn (40 in. rows harvested for grain)	111
2. Drilled corn, high population, 1 crop for silage	111
3. Drilled corn, high population, 2 crops for silage	114
4. Drilled corn, high population, 1st crop taken for silage, 2nd crop plowed down for green manure	115
5. Oats followed by drilled corn plowed down	115
6. Drilled corn, high population, 2 crops plowed down for green manure	122
7. Oats, with an alfalfa and red clover catch crop	121

(Continued)

Yield differences between treatments 1 through 5 were too small to be significant. Treatments 6 and 7 were about equal, and both showed greater yields than the other five treatments.

In treatments 3, 4, and 6, the first corn crop was taken off for silage--or plowed under--at tasseling time. The plots were then plowed and replanted. The second crop was taken off or plowed under just before frost.

In treatment 5, the oat crop was harvested, the plots were plowed, and the corn was planted. The corn was then plowed down before frost.

Treatment 7--oats plus catch crop--helped corn yields most and was cheapest, since it received no fertilizer.

A corn crop produces considerable organic material. Plowed-down corn may be of some value on soils seriously deficient in organic matter. However, corn does not appear to be a practical green manure crop for most Illinois farmers, even on diverted acres. A legume catch crop supplies additional nitrogen, is cheaper to grow, and gives just as much help to the following corn crop.

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NEWS

COLLEGE OF AGRICULTURE

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URBANA

May 9, 1962

CONTROL THOSE EARLY WEEDS

No. 208

Like the early bird that gets the worm, it is the early weed that gets the crop. It is the weeds that begin growing with the crop that do the most damage. Early control pays off, particularly in soybeans and in hill-dropped or drilled corn where you can't control grasses in the row with cultivation or post-emergence 2,4-D applications.

More and more farmers are using pre-emergence herbicides at planting time. These chemicals control annual grasses like giant foxtail particularly well. They will also control early weeds when wet weather makes timely cultivation impossible. Look for help from herbicides if you've had a serious weed problem or if you expect one.

Used as an early post-emergence herbicide in corn, 2,4-D controls many broad-leaved weeds economically and effectively. For greatest effectiveness with 2,4-D, spray early. Weeds are easiest to kill when they are tender and small.

Use 1/2 pound of the amine form or 1/4 pound of the ester form of 2,4-D per acre. If you use a product that contains the equivalent of four pounds of 2,4-D per gallon, one pound per quart, or 1/2 pound per pint, you will need one pint of the amine or 1/2 pint of the ester form to treat an acre. Label directions show the amount of acid equivalent. Don't use the ester form of 2,4-D where it may endanger susceptible crops. Some farm liability insurance policies do not cover crop damage caused by the ester form of 2,4-D.

So far no good post-emergence herbicides have appeared on the market that will control weeds safely in soybeans. A few farmers use a very light application of 2,4-D for very serious weed problems in bottom lands. But use this material only if you're an experienced operator!

Rotary hoeing still kills early weeds quickly and economically. Begin this operation after weed seeds have germinated--when you find little white seedlings below the soil surface. By operating your tractor at 10 to 15 miles per hour, you can do an effective job in a short time. Rotary hoeing becomes less effective on three- or four-week-old, well-established grass weeds.

Shovel cultivators are the most practical and economical means of controlling weeds, especially between the rows. However, with 90 percent of the corn either hill-dropped or drilled in Illinois, cross cultivation has almost passed out of the picture. By cultivating early and adjusting shovels properly, you'll be able to kill weeds in the row by covering them with soil.

Where weeds are a serious problem, supplement your cultural methods--rotary hoeing and cultivating--with chemicals to get the most effective weed control.

(Continued on other side)

Flame cultivation has not proved successful enough in Illinois to recommend it for killing weeds. Flame heat will control weeds if applied often enough to small weeds. But it will damage corn or soybeans less than 10 to 12 inches high. By the time the crop has reached this height, weeds which started growing at the same time as the crop have grown too large for the flame to be most effective. For the present, consider pre-emergence herbicides and cultural practices your most practical and economical weed-killing helpers.

You may be hearing about LoroX, a new herbicide that has label clearance for use on corn 12 to 18 inches high. Agronomists do not yet have enough information to recommend this chemical. They are conducting additional research on it, including tests in county weed control demonstrations this year.

Weeds can be controlled. Give them both barrels by combining chemical and cultural methods and most important--get the job done early.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 11, 1962

HOW ABOUT SUGAR BEETS FOR ILLINOIS?

No. 209

Can we produce sugar beets in Illinois? There is no simple answer. Political and economic factors are of utmost importance, probably more so than the agronomic aspects.

Sugar beet production is strictly controlled by the federal government. Acreage quotas are allotted to sugar companies, which then contract with farmers for the beets they need. No sugar beets are sold on the open market; all are produced under contract. Government payments hold the U. S. price at nearly twice the world market price. Without this support U. S. beet growers could not compete with foreign sugar cane.

At present Cook and Lake County vegetable growers grow several thousand acres of sugar beets under contract for sugar plants in Wisconsin. There are no sugar refineries in Illinois.

Sugar beets are bulky and costly to ship long distances. Sugar beet production is feasible only when a sugar refinery is near by. Before a sugar refinery would move into other areas of Illinois, two things must occur:

1. Congress must amend the present sugar act to grant a long-term allotment to this area. The Cuban quota is now up for grabs, and the clamor is loud. Everyone presently involved in sugar production would like a juicy piece. Many areas that have never produced sugar are also in the battle. Illinois, Indiana, and Missouri are just a few among the many. Congress is now holding committee hearings on this bill, which must be renewed by July 1, 1962.
2. A sugar company then must decide that it will be profitable to build a plant here. Sugar refineries cost 8 to 10 million dollars. Even with an allotment no company will spend this money unless it will be worth its while. One sugar company has expressed interest in the Wabash Valley of southern Illinois, but it will certainly consider all aspects thoroughly before moving in.

How about production? Although no valid data are available for this area, information from similar areas suggests that southeastern Illinois farmers could probably produce adequate tonnages of sugar beets. Research carried on last year in comparable situations in Missouri bears out this conclusion.

Numerous questions remain unanswered, however. The sugar content of beets is most important, since it is the basis on which the farmer is paid. This cannot be determined without trials in the area itself. Sugar content was relatively low in Missouri trials, and that may also be true in central and southern Illinois.

The basic soil needs of sugar beets are good drainage and favorable tilth in the zone in which the beets develop. Good drainage favors a long, tapered shape, which promotes high yield. Good tilth is necessary for the beets to grow normally to large size. Many Illinois soils meet these basic requirements. However, sugar beets require ample soil moisture and will not produce well under drouthy conditions that frequently prevail, particularly in southern Illinois. Supplemental irrigation will be required during growing seasons when rainfall is deficient.

There is little or no information on varieties suitable for this area. Agronomists from other states and from interested sugar companies can supply general recommendations, but specific local information is necessary.

Diseases are a constant problem in sugar beet production, and their impact in Illinois is not yet known. Plant pathologists warn of possible danger from Cercospora leafspot and curly-top virus. New varieties and/or pesticides may be required to help withstand these diseases.

Weed control will certainly be a problem. Endothal, Dalapon, and TCA have been used in many beet production areas, but with varying success. New chemicals may be needed to better fill this need.

As you see, many problems exist and many questions are unanswered. However, there is know-how among both University and sugar company personnel to tackle these problems. Most, if not all, of them probably could be solved. Agronomically, sugar beet production should be possible in the Wabash Valley.

Farm advisers in southeastern Illinois are cooperating with agronomy specialists in county sugar beet demonstrations. Additional trials are under way at many of the soil experiment fields over the state. These trials will supply information that will be valuable if this area receives a quota.

Other problems remain, of course. Sugar beets have always required large amounts of hand labor, usually supplied by migrant workers. Specialized modern machinery can do away with this problem, but the expense is high.

The big question is whether or not the crop will pay. Illinois agricultural economists, using Michigan cost figures, estimate that the price of beet sugar must rise 25 percent for beets to equal corn or soybeans in net return in Illinois. Since beet tops are not utilized in northern corn belt sugar beet areas, they were given no value. Tops can be used for feed but must be carefully handled and fed. Their feeding value is roughly half that of corn silage.

To sum up, adequate tonnages of sugar beets can probably be grown in central and southern Illinois, although supplemental irrigation may be necessary. Potential sugar content of these beets is not known, but it may be low. Trials conducted in Illinois this summer should supply preliminary answers.

Most important, any increase in Illinois sugar acreage depends on (1) a congressional amendment to the sugar act and (2) an interested sugar company to build a plant in the area.

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NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 18, 1962

SOYBEANS IN ILLINOIS

No. 210

Once again it's time to plant soybeans. In tests of different planting dates made at Urbana, beans planted May 15 yielded six more bushels than those planted a month later. However, soybeans suffer less from late planting than corn, so it still pays to plant corn first. This also gives you a chance to kill a couple of crops of weeds on your bean fields.

Don't overwork your field before planting soybeans. A seedbed that is right for corn is right for beans. University trials show that soybeans planted with a minimum amount of soil preparation do as well as those planted in well-worked seedbeds.

Use certified seed of varieties that perform well in your locality. Buy your seed from a reputable dealer who sells quality seed. Planting "cheap seed" is like Russian roulette; sooner or later it's going to get you. Varieties recommended for Illinois are listed below, ranked in order of maturity:

Northern Illinois

Central Illinois

Southern Illinois

Chippewa

Lindarin

Adams

Lindarin

Harosoy

Shelby

Harosoy

Hawkeye

Clark

Hawkeye

Adams

Kent

Adams

Shelby

Clark

Fertilizer will generally not pay on well-managed land that has been well fertilized for other crops. Soybean seeds are easily damaged by direct contact with fertilizer and therefore broadcasting before planting is preferred. When making row applications on soils that test low in phosphorus and potassium, use a planter that puts the fertilizer 2 inches to the side and 2 inches below the seed and apply no more than 40 pounds each of P_2O_5 (17 pounds P) and K_2O (33 pounds K). For best results on low fertility soils, use soil test results and develop a long term sound fertility program.

Your soybean plants need lots of nitrogen nodules on their roots. Inoculation is cheap insurance. Inoculation effectiveness will be reduced though, if the seed is chemically treated for soil-borne diseases after inoculation. Chemical seed treatment will increase stands but does not generally increase yields. Seed treatment can be helpful on seeds with low germination.

The majority of Illinois farmers grow soybeans in 36- to 40-inch rows, however, an increasing number are shifting to narrower rows. All soybean varieties yield higher in 24-inch rows than in 40-inch rows. Results show that narrow row planting increases yields an average of 15 percent. On many farms this yield advantage is enough to justify the cost of adapting equipment to handle narrower rows.

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The right planting rate depends on row width, seed quality, and soil type. On soils that crust, thicker planting will insure a more satisfactory stand, because the seedlings help each other to break the crust.

As a general rule 8-12 seeds per foot of row is adequate. To get this spacing plant 45-70 pounds of seed per acre. Close spacing of seed encourages rapid growth and helps control weeds, but spacings closer than 1 inch may seriously increase lodging. Plant 1 to 2 inches deep in moist soil. If the soil is dry, it's better to wait for a rain than to plant too deep in an attempt to reach moist soil.

The rotary hoe is an economical tool for killing weeds. It should be pulled rapidly at 10 to 15 m.p.h. Do this during the heat of the day when the plants are limp to prevent easy breaking. Don't worry about the beans at the first hoeing. Killing 10 percent of the soybean plants is not serious since the remaining plants will cover the gaps. Killing weeds is more important.

Use chemical weed control when previous experience indicates that cultivation won't control weeds and that yields may be severely reduced as a result. In using chemicals it is essential that you follow suggested rate, methods, and timing. For details, see recent Agronomy News issues 205 and 206.

A good soybean crop doesn't just happen. But the recipe is simple. Use good seed, plant it right, and control weeds.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 21, 1962

No. 211

SIDE-DRESSING CORN WITH NITROGEN

Each year farmers give side-dressing corn with nitrogen increased attention. Side-dressing is not necessarily better than plowing under or broadcasting before planting. Each method of application has advantages, and to a considerable extent personal preference, available equipment, convenience and cost may be the determining factors.

You should consider side-dressing your corn:

1. If you did not apply enough nitrogen before or at planting time.
2. If unusually heavy rains occurred during May and June. Leaching of nitrogen may occur, especially on sandy soils. Extra wet conditions may have caused denitrification loss on poorly drained soils.

Side-dressing has one special advantage: You can apply nitrogen in years when you most need it and omit it in other years. If, for example, you have a very poor stand of corn, or large areas drowned out, or you can't control weeds early in the season, you can save the nitrogen you planned to side-dress. If, on the other hand, you have an unusually good stand and plenty of moisture in the sub-soil to produce top yields, you can side-dress at an extra heavy rate.

What materials may be used?

Dry, liquid, or gaseous nitrogen carriers may be side-dressed. Available equipment, convenience and cost of material plus application should dictate which form to use. Always compare costs of nitrogen fertilizers on the basis of cost per pound of actual nitrogen applied to the soil. If applied correctly, the different forms of nitrogen are nearly equally effective.

Where should the nitrogen be placed?

Consider the depth of nitrogen and its position in the row space. Depth is important for two reasons:

1. To be available to corn roots, nitrogen must be in moist soil. If placed in dry soil, you'll need rainfall to move it down to the crop roots.
2. Some nitrogen carriers must be discharged under the soil surface to prevent evaporation losses. So place anhydrous ammonia four to six inches deep, and solutions that contain free ammonia at least one inch deep.

Don't risk side-dressing any nitrogen fertilizer directly on the soil surface. The nitrogen will not be effective unless adequate rainfalls move the nutrient into the plant root zones.

Avoid root damage by side-dressing in the middle of the corn row, especially when using deep-running blades or shovels to place the nitrogen. The problem of root damage becomes more serious as the plants get taller and their root systems become more extensive. You gain nothing by side-dressing close to the row because the roots from adjacent plants meet when the corn is about knee-high.

When should you side-dress?

You may side-dress nitrogen any time from corn planting until the plants become too tall to permit equipment passage. Delaying the application, however, may allow soil to dry, making it difficult to get the nitrogen into moist soil. It may also increase the possibility of root damage. The best time to side-dress? Plan to apply before the plants reach "knee-high."

How much nitrogen should you apply?

How much to apply depends, of course, upon your estimate of the total amount that it will pay you to use and the amount that you have already applied before or at planting time. Here are suggested total amounts of nitrogen to apply. Reduce the amount that you side-dress by the amount that you have already applied.

Situation 1. Following a good legume sod or 10 tons of manure. Consider a rate of 0 to 70 pounds of nitrogen per acre. Dark prairie soils with a good legume sod or 10 tons of manure will usually supply enough nitrogen for 90 to 100 bushels of corn. If you are aiming for 100 to 125 bushels, you will need to apply 50 to 70 pounds of nitrogen per acre. Probably you won't want to broadcast less than 50 pounds per acre. At lower rates the application cost becomes too high compared to the nitrogen cost.

For light-colored timber soils, you may apply as much as 70 pounds of nitrogen.

Situation 2. Following soybeans, a small grain--no catch crop--or one year of corn in a farming system that includes a legume hay crop or catch crop once in 5 or 6 years. Agronomists suggest a rate of 70 to 100 pounds of nitrogen on dark prairie soils and 100 to 120 pounds on light-colored timber soils. Apply the lower rate in either case on soils that will average 70 to 80 bushels of corn per acre with good management. Apply the higher rate for superior management on soils with average yields in the 90- to 105-bushel range. These soils will produce 140 to 150 bushels in the best years without uneconomically heavy fertilizer rates.

Situation 3. Corn in a continuous corn or corn-soybeans grain farming system. For most economical production, crops require 100 to 150 pounds of nitrogen per acre in such a system. The lower rate may be adequate on very dark soils where corn yields 85 to 90 bushels per acre on a long-term average with good management. These dark level to depressional silty clay and clay loams yield less than the better drained silt loams. Therefore, they will not return a profit with as heavy a rate of nitrogen.

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AGRONOMY

CROPS AND SOILS

NEWS

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UNIVERSITY OF ILLINOIS

URBANA

June 6, 1962

No. 212

CONTROL THE "ITCH"

At this season of the year, many city dwellers "just itch" to spend their leisure time in the great outdoors. Most of them who contact poison ivy will really itch. However, they will not be the only sufferers. Farmers mending fences or clearing brush, utility linemen, and other outdoor workers can be just as susceptible.

With modern effective weed killers, you can kill this pest that causes so much misery and suffering each year. But first you must learn to identify poison ivy.

Identification

Poison ivy, a perennial woody plant, varies greatly in the way it grows and in the appearance of its leaves. It may spread along the ground, grow as a vine on fences, walls, or trees, or grow as a shrub.

Three leaflets make up each compound leaf. The leaflets may be a glossy or dull green. The edges of the leaves may be smooth, toothed or somewhat lobed. These variations occur even on the same plant.

The Poison

The skin irritant in poison ivy is found in sap of the roots, stems, leaves, and berries. Although some people apparently are more immune than others, those who consider themselves immune may become susceptible after sufficient exposure.

A very small quantity of the poison may produce severe inflammation and can be transferred from one object to another. Clothing, garden tools, and pets may become contaminated and serve as a source of infection. The poison may also be carried in smoke from burning poison ivy plants.

Control

Modern weed-killing chemicals (herbicides) offer the easiest and safest method of controlling poison ivy. The herbicides mentioned here, when handled properly, will effectively kill poison ivy. But don't allow them to contact desirable plants. To avoid drift to desirable plants, spray on a quiet day when there is no wind. In all cases, read and follow directions on the container labels.

Amitrole (3-amino-1,2,4-triazole) is most effective for killing poison ivy. You may find it under such trade names as Amino Triazole, Weedazol, and Poison Ivy Killer. Aerosol cans containing amitrole provide a convenient method for treating small patches.

(continued)

For treating with a small hand sprayer, mix 3 level tablespoons of the commercial preparation containing 50 percent amitrole with one gallon of water. For large areas, mix one pound of the 50 percent material in 25 gallons of water.

You can apply amitrole from the time the plants make their early spring growth and the leaves reach full size until they begin to change color in the fall. Thoroughly wet the entire plant with spray, but do not let amitrole contact desirable plants. If there's a chance that you will damage desirable plants by spraying, apply amitrole to ivy leaves with a long-handled brush.

Brush killer is the name commonly applied to mixtures of 2,4-D and 2,4,5-T. The mixture kills poison ivy more effectively than 2,4-D alone. Brush killer, convenient for treating poison ivy, will also kill other undesirable woody plants where the two grow together. Most grasses tolerate 2,4-D and 2,4,5-T better than amitrole. However, 2,4-D and 2,4,5-T increase the danger of drifting vapor to desirable broad-leaved plants in the area.

Apply brush killer when the plants reach the full leaf stage in the late spring or summer. If regrowth occurs, repeat the treatment. If a sprayer has been used for brush killer, do not use it for spraying ornamentals or crops sensitive to these weed killers.

HOW TO MIX BRUSH KILLER SPRAYS

<u>To this many gallons of water</u>	<u>Add this much brush killer*</u>
1	2 tablespoons
3	6 tablespoons
25	1 1/2 pints
100	3 quarts

(*For brush killer containing 4 pounds of acid equivalent per gallon.)

Poison ivy can make both you and your children miserable. Be sure you know how to identify it. Then, whenever you can, kill it today the chemical way.

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AGRONOMY

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UNIVERSITY OF ILLINOIS

URBANA

July 2, 1962

No. 213

DOES NITROGEN AFFECT THE MATURITY OF CORN?

What effect does nitrogen have on the maturity of corn? Widespread opinion suggests that nitrogen delays maturity, particularly if phosphorus and potassium are out of balance. However, research results do not bear this opinion out. University trials conducted in many states have consistently shown little effect on maturity due to nitrogen.

Illinois agronomists compared various levels of nitrogen fertilization in 84 field trials in 1955 and 1956. Moisture samples were taken at harvest time. For all practical purposes moisture content is the best indicator of maturity. Driest and wettest samples were noted for each trial. The summary below compares these results:

Nitrogen lb./acre	Number of trials in which treatment was	
	<u>Driest</u>	<u>Wettest</u>
0	28	22
50	16	17
100	15	20
150	25	25

Note the similarity between the extremes. There is no indication that 150 pounds of nitrogen affected maturity either way. In 21 of these fields the corn contained more than 20 percent moisture at harvest. Let's compare the average moisture of this corn at the various nitrogen levels:

<u>Nitrogen lb./acre</u>	<u>Percent moisture</u>
0	23
50	23
100	23
150	23

How about very high rates? Suppose phosphorus and potash are out of balance? In 1960 Illinois agronomists decided to really unbalance these elements to see what would happen. The rates applied are shown below:

N	Treatments		Percent moisture at harvest
	<u>P₂O₅</u>	<u>K₂O</u>	
50	1,000	800	21.4
1,000	1,000	800	22.1
1,000	0	0	22.6

Even at these extreme rates there were no appreciable differences in maturity as measured by moisture content. Existing differences were too small to be statistically significant.

Well, suppose we apply nitrogen regularly over a number of years. Will nitrogen build-up affect maturity? Data from the Morrow Plots in Urbana supplied answers to this one. Since 1955 half of the plots in the corn, oats, clover rotation have received 50 pounds of N, 40 pounds of P_2O_5 , and 30 pounds of K_2O . Corn crops were taken in 1955, 1958, and 1961.

	No fertilizer <u>% moisture</u>	Fertilized <u>% moisture</u>
1955	17.9	16.8
1958	19.6	20.0
1961	17.8	17.1

Note that again there is essentially no effect on maturity due to the fertilizer

Illinois farm trials add to the picture. Eight fields in Ford County and two in Iroquois County received N, P_2O_5 , and K_2O at the rate of 21-84-42 plus nitrogen broadcast as follows:

<u>Nitrogen lb./acre</u>	<u>Percent moisture Ford County average</u>	<u>Percent moisture Iroquois County average</u>
0	24.4	24.2
50	23.6	23.6
100	23.6	23.4
150	24.3	23.4

In summary, we see that nitrogen, even at very high rates, seldom changed the moisture content as much as one percent. Why, then, do many people believe that nitrogen delays maturity? This popular belief probably comes from the fact that the lower leaves on nitrogen-deficient plants turn yellow and die, giving a false impression of early maturity. Possibly nitrogen may delay maturity under very unusual conditions. However, the results shown above all agree, indicating that if there is any normal effect of nitrogen on maturity, it is too small to measure

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

August 3, 1962

No. 214

PLAN YOUR SUMMER SEEDINGS

If you are planning to seed alfalfa this summer, here are some hints you may find helpful.

What are the advantages of late summer seeding? (1) You avoid competition from a small-grain companion crop. (2) Also, weeds are less of a problem than in the spring, so forage plants have less competition to battle and, once well established, can go on to produce top yields the following year.

There are disadvantages too. Lack of moisture can be a real problem, particularly in southern Illinois. Also, late summer seeding favors the grasses in the mixture. Grasses grow faster than legumes in cool weather. They will be tough competitors during the fall months.

You can partly overcome these disadvantages. Pay particular attention to your planting date. For best results, seed by September 1 in northern Illinois and by September 15 in the southern part of the state. This gives the young plants time to get well established before cold weather.

You can't always order rain as you would like it, but various seeding methods make the most of available moisture. A cultipacker-type seeder does a nearly ideal job. It places the seed at shallow depth--about 1/2 inch--and firms the soil above and below the seed. Moisture, if available, will reach the seed and will start growth.

Band-seeding attachments are now available for most grain drills at reasonable prices. Illinois agronomists have found that band seeders improve stands where seeding conditions are below par. If you generally get good alfalfa stands, you probably won't get any improvement by band seeding. However, if you've had trouble in the past--and it was not due to low fertility--then band seeding may help you get better stands.

For best results follow these two rules: (1) Keep the seed in the top half inch of soil, and (2) roll the field after planting. If you don't usually roll your forage seedings, try it and leave a strip through the field unrolled. Unless moisture conditions are ideal, you will see the difference.

A soil test should be your first consideration whenever you make an alfalfa seeding. The pH test for soil acidity gives key information. If the pH level is below 6.0, alfalfa plants may get started, but they won't survive. If the pH is below 6.2, alfalfa will not yield well. Many soils in Illinois test below 6.0, and some go below 5.0. If your soil tests below 6.2, add lime or you will be disappointed.

Cooperative Extension Work in Agriculture and Home Economics
University of Illinois College of Agriculture and the United States
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Acts approved by Congress May 8 and June 30, 1914.

Vigorous new alfalfa varieties will increase your chances of getting a good legume stand. They will establish faster than some of the older varieties and will compete better with the grass during the fall. And they will give you more tons per acre the following year.

There are two types of alfalfa varieties: (1) fast-growing varieties like DuPuits and Alfa, for short-term stands and (2) wilt-resistant varieties like Buffalo, Vernal, and Ranger, designed for short or long rotations.

Which ones are best suited to your farm? It will depend on how you use alfalfa. If you leave it down only one or two years and are equipped to harvest on or before June 1, then DuPuits and Alfa will give you outstanding production. If you can't harvest that early, Vernal and Buffalo are better bets. They mature after DuPuits and Alfa and tend to be less stemmy when harvest must be delayed into June.

Buffalo and Vernal are resistant to the bacterial wilt diseases that kill out susceptible alfalfas in the third harvest year. Therefore, they are well adapted for long-term stands.

Ranger, our standard for many years, can no longer keep pace with these superior newcomers. In University of Illinois trials, DuPuits and Alfa consistently out-yield Ranger by over a ton per acre per year. Vernal outyields Ranger by over 1/2 ton per year and is more resistant to leaf diseases.

If you plant a large acreage, you may have a place for both early- and late-maturing types. DuPuits will give you top yields for early harvest, while the later maturing Vernal and Buffalo can help you spread your harvest season.

What about seed cost? You may pay \$1.00 to \$2.00 more per acre to seed one of these new varieties. However, you can increase your forage yields by 1/2 to 1 ton of dry hay per acre per year. Where else can you get a bigger return on an investment?

No matter what variety you use, be sure to seed it early enough. Give the seedlings plenty of time to get well established before winter. Plant before September 1 in northern Illinois and before September 15 in the southern half of the state.

Successful late summer seedings are generally not accidents. University trials and farmer experience show that you'll be ahead if you seed on time, fertilize as needed, and use good seed.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 6, 1962

No. 215

SUGGESTIONS FOR FERTILIZING WHEAT

Seeding wheat this fall? Here are some tips on fertilization. First, be sure to test that soil. Fertilizer can increase wheat yields, but you'll make more money if you use the right amounts and the right kind. Then follow three rules, all well proven in both University trials and farmers' fields.

1. Be sure there is a good supply of soluble phosphate. Wheat needs phosphate rapidly, and rock phosphate will not meet its needs. Phosphorus stimulates rapid growth, helps wheat live through the winter, and aids in building a strong, healthy plant, capable of high yield. So phosphate should be broadcast ahead of planting or drilled with the seed so that it will be on the job when needed. If large amounts are needed, it's best to broadcast some and then drill the rest. This broadcast portion gives an important boost to the alfalfa and clover underseeding, and also helps the wheat.

The P_1 soil test indicates the amount of phosphorus in the soil that is available to the wheat plant. The table below gives suggested applications of P_2O_5 for wheat seeded with alfalfa or clover:

P_1 soil test, lb. P per acre	Suggested lb. P_2O_5 to apply		
	Broadcast	+	Drilled
10-15	90 to 150	+	30
	0	+	80
20	60 to 120	+	30
	0	or	80
30	60 to 90	or	60
40	0 to 60	or	30-60
60	0		30

2. Apply nitrogen as needed. Your nitrogen program greatly affects both yield and profits from the wheat crop. It can also affect the alfalfa or clover seeded in the wheat.

Wheat is a grass and so it usually responds to extra nitrogen up to the point where lodging occurs. Nitrogen boosts yields most on the light-colored soils of southern and southeastern Illinois. Coarse-textured sands and sandy and gravelly loams also need extra nitrogen, since nitrates leach through such soils.

You may apply nitrogen in either the fall or the spring or both. The right time depends mostly on your soil. The fall nitrogen requirements of the wheat plant, while essential, are not large. Total uptake by plants and roots usually won't exceed 30 to 40 pounds per acre. Most dark Illinois prairie soils can supply at least this much. Fertile soils that are rather high in organic matter may not need nitrogen at planting time.

On light-colored soils, use a fertilizer with a nitrogen to P_2O_5 ratio between 1:2 and 1:5. You can apply it as a mixed fertilizer, or you can broadcast the nitrogen first and then drill the phosphorus with the wheat.

On claypan soils, where little leaching occurs, you can apply all of your nitrogen in the fall and avoid spring topdressing. Responses from fall-applied nitrogen average 1 to 2 bushels below those of spring applications. However, in many years wet soils make spring applications either too late or impossible. Fall applications also have the advantage of being already on the field.

Fall applications are usually satisfactory on medium-textured well-drained soils. But you should add supplemental spring topdressing on coarse-textured soils where leaching is likely to occur.

Spring topdressing. Most Illinois wheat fields will respond to nitrogen topdressing. The best guide on how much to apply is your own experience from previous years on the same or similar fields.

Timing is most important. Apply nitrogen either before or at the time wheat greens up. On level fields you may apply it on frozen ground. On sloping fields, let the ground thaw to prevent runoff loss. Refer to the table below to determine total nitrogen rates. Subtract the amount applied at planting time to find the rate to topdress in the spring.

Amounts of Nitrogen Suggested for Different Soil Situations

Soil situation	Total nitrogen, fall and spring	
	With alfalfa or clover seeding	No seeding
Soils low in organic matter, no manure or clover for two years	40-50 lb.	50-60 lb.
Soils medium in nitrogen- supplying capacity	20-40 lb.	30-50 lb.
Soils high in nitrogen- supplying capacity	0	20-30 lb.

Generally the minimum practical application is about 20 pounds.

3. Be sure to provide enough potassium to meet the needs of the clover and alfalfa if you plant over seed in the spring. Wheat rarely responds to potassium unless the soil test is below 100. However, potassium applied before or at wheat planting time will help establish your forage legume.

In applying both nitrogen and potash, remember that these are salts. Drilling large amounts with the seed can burn the wheat seedlings. Generally the total amount of nitrogen plus potassium should not exceed 40 pounds per acre. Drilling 15 to 20 pounds of nitrogen leaves a safe margin of only 20 to 25 pounds of potassium. Alfalfa and clover need more than this amount unless soil levels are already optimum. A heavier broadcast application, perhaps 60 to 120 pounds of K_2O , is more logical for building and maintenance.

If you value your seeding, keep your fertilizer balanced. A high supply of nitrogen with little or no phosphate or potash will give a heavy wheat growth, but little clover. Use all three for top wheat yields and good forage stands.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 11, 1962

No. 216

1962 WHEAT VARIETY RECOMMENDATIONS FOR ILLINOIS

Each wheat variety has its own personality, with both strong and weak points. Illinois agronomists compare varieties side by side at several locations to see how each measures up. More than 30 county demonstrations also compare variety potential. These tests define the personality of each variety, supplying the information you need in choosing a variety for your farm.

In selecting a wheat variety, you will first decide whether to plant a soft or hard wheat. Or your local market or elevator may decide for you, since it may buy only one type or the other. However, in some areas farmers can grow either one. If you have a choice, remember that soft wheats generally yield more than hard wheats, particularly in southern Illinois.

This year at the Brownstown Experiment Field in Fayette County soft wheat varieties averaged 14 bushels per acre more than hard. Last year soft wheat yields were 6 bushels higher. At Urbana the difference was 2 bushels per acre in 1962 and 4 bushels in 1961, still in favor of soft wheats. In some areas of the state farmers receive small premiums for hard wheat--or discounts on soft. This premium is rarely high enough to make up for the yield difference. So where you can choose, consider growing soft wheat. But before you do, be sure your local markets will accept it.

Recommended soft wheat varieties include Monon, Vermillion, Knox, Dual, Seneca, and Lucas. Illinois farmers plant more acres of Monon and Vermillion than of any other soft wheat. Knox and Dual are falling behind because they are susceptible to loose smut. Many farmers prefer Monon because of its short, stiff straw. It is well adapted to early planting, as it has resistance to Hessian fly. Vermillion does well when planted after the fly-free date.

Recommended hard wheat varieties include Pawnee, Ponca, and Triumph, as well as two newcomers, Ottawa and Omaha. Both yield well and have resistance to soil-borne mosaic, which can cut yields of Pawnee, Ponca, or Triumph. Ottawa may yield slightly more than Omaha. However, it is somewhat susceptible to loose smut, while Omaha and other recommended hard wheats are resistant. Sedimentation tests rate both Ottawa and Omaha above other hard wheat varieties in baking quality.

The table on the back gives the yields and test weights for wheat in recent agronomy Department trials at Urbana and at Brownstown. In considering these figures, remember that the three-year averages are truer indicators of the potential of a variety than the 1962 figures taken alone.

Next, a newly released soft wheat variety from Indiana, appeared promising in both tests. Illinois agronomists will be watching it closely. No commercial seed is available. Ottawa and Omaha did well at Urbana, Ottawa topping the hard wheats in this test for the second straight year. Nearly all hard wheats yielded less than soft wheats at Brownstown, with Triumph well above its usual performance.

Variety	Yield (bu./acre)				Test weight (lb./bu.)	
	Urbana		Brownstown		Urbana	Brownstown
	1962	1960-62	1962	1960-62	1962	1962
<u>Soft Red</u>						
Monon	47	47	46	43	61.8	57.8
Vermillion	45	46	46	42	60.6	57.8
Knox	50	49	51	41	62.6	59.3
Dual	47	49	46	39	58.3	57.7
Seneca	36	41	50	45	58.4	60.5
Lucas	37	44	46	41	58.9	60.3
Reed	53		52		60.3	60.3
<u>Hard Red</u>						
Pawnee	43	47	32	33	61.4	57.0
Ponca	42	44	32	33	61.8	56.8
Triumph	41	44	43	36	63.6	59.8
Omaha	44	45	30	33	63.0	57.8
Ottawa	50	50	30	35	62.8	55.8

The variety you plant is important. But so is the seed. Most Illinois farmers plant recommended varieties. However, recent surveys showed that one-third of the wheat seed planted was unfit for seed. Home-cleaned seeds often rated high in weed seeds and sometimes low in germination. Custom-cleaned seeds were better, but poor lots still occurred. Certified seed is your best bet for high quality. It is consistently free of noxious weed seed and is high in germination and varietal purity.

Price of seed is one of the smallest costs involved in sowing wheat. The extra dollar or two per acre you pay for good seed can be your best investment.

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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

September 20, 1962

No. 217

MUSIC AND CORN GROWTH

Many people are curious about the possible favorable influence of music on corn yields, and about the effect of sound on plants in general. This interest is prompted by continuing news reports of experiments purporting to show that music has a beneficial effect on plant growth or yield.

University scientists see no reason to believe that moderate intensities of sound, such as those that could be applied to a corn field, could have any effect whatsoever on plants. No beneficial effects have ever been observed on plants with sounds of any intensity, high or low. In fact, there is no known genetic, biological, or physiological reason to believe that sounds can affect plants.

It is true that extremely high intensities of sound can damage plant cells; however, such sound waves are so intense that they can be produced only over a few cubic inches. These extremely loud sounds are thousands of times more intense than any sound that could be applied to corn plants in a field.

It has been suggested that energy from sound vibrations may affect soil temperatures. A measurable rise in soil temperature can be caused only by the rather large amounts of energy. The energy reaching a plant from a loudspeaker in a field would be negligible in comparison with the energy received from sunlight and wind or even the energy involved in the respiration of the plant. Therefore, music could have no significant effect on plant temperature or soil temperature.

Experiments here at the University of Illinois have shown that sound for 18 hours a day had no discernible effect on the germination of corn seeds or on root growth. Nor did it have any effect on the early growth of the corn shoot. This agrees with data from other experiment stations around the world.

Everything considered, we feel that it is very unlikely that music can be of any benefit in speeding up growth of corn in the field.

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URBANA

September 25, 1960

No. 218

CONTROL PERENNIAL WEEDS NOW!

Are you a northern Illinois farmer with a quackgrass problem? Or are you located in southern Illinois, where wild garlic and onion cut your profits? In either case you can help yourself during the next few weeks. All three weeds are sensitive to herbicides during the fall months. And fall applications offer fewer problems than those made in the spring. Fields are usually drier and easier to get over in the fall, and there is usually less pressure from other farming operations.

Quackgrass can be controlled with fall applications of atrazine. Northern Illinois farmers may put this on anytime from late August until the ground freezes. Apply 5 pounds of the wettable powder per acre. This rate is equivalent to 4 pounds of active ingredient per acre, since the commercial powder is 80 percent pure. Because atrazine is a wettable powder, you'll need at least 20 gallons of water per acre to keep the particles suspended and provide good leaf coverage. Don't use granules because they bounce off the leaves and fall to the ground. Leaf coverage is necessary for good fall quackgrass control.

Apply atrazine when the grass is growing rapidly. Quackgrass goes dormant during the summer but takes off in the fall and spring. If the quackgrass has gone to seed, mow it first and then let new growth come on before spraying.

Use atrazine only where you plan to plant corn for the next two years, since there is likely to be carry-over in the soil. Corn can withstand atrazine, but oats and soybeans can not.

Use atrazine only on harvested corn fields or soybean or hay or pasture land that you will plow for corn next year. Where you have applied atrazine, don't plow or cultivate before spring. Atrazine works best when fall rains have time to wash the material into the soil around the quackgrass roots.

Wild garlic and wild onion can be controlled by fall treatments of 2,4-D. Southern Illinois farmers can nearly eliminate these pests by applying 2,4-D ester at the rate of 2 or 3 pounds of active ingredient per acre. Mix in 5 to 10 gallons of water for good coverage.

Spray when the garlic or onions are 4 to 6 inches tall. They are most sensitive to 2,4-D at this stage. As they mature, they become more resistant. Wild garlic and onion remain dormant during the summer and start growth with cool weather and fall rains. They generally reach the sensitive 4- to 6-inch stage in late October or early November.

Apply 2,4-D only on corn or soybean stubble or permanent bluegrass pasture. Although wheat becomes resistant to 2,4-D in the spring when tillering begins, it is highly sensitive in the fall. Alfalfa and other legumes are also sensitive and would be knocked out by this rate of 2,4-D. Use the ester form of 2,4-D; it packs more wallop than the amine form and does a much better job on onion and garlic.

Some garlic and onion bulbs may not germinate in the fall and a few may live over into the spring. When this occurs, a follow-up application in late February or March should eliminate these late emergers.

If you had quackgrass, wild garlic, or onion last year, it probably cut your profits. Get even this fall. With these weeds controlled, you will be money ahead next year.

Cooperative Extension Service, College of Agriculture, University of Illinois
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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

October 8, 1962

No. 219

LATE FALL ALFALFA MANAGEMENT

How late in the fall can you graze or cut alfalfa? That depends on how you use your crop. Here are some points to consider:

First, will it harm your stand? University tests agree that grazing or mowing alfalfa in late October or November does not generally hurt stands. However, mowing or grazing earlier in the fall can.

Damage--or lack of it--depends on root reserves. The alfalfa plant draws on food stored in its roots until it is 4 to 6 inches tall. Afterwards it produces surplus food that goes back into the roots.

To get through the winter, the alfalfa plant must have a good food supply. So University agronomists warn against grazing or cutting during the last half of September and early October. When cut at this time, alfalfa plants begin to grow again, using up stored food from their roots. Then cool weather hits before they are able to replenish the root stores. Left with a low food supply, the plants often die before spring.

By late October and November, alfalfa growth has nearly stopped. Mowing or grazing no longer stimulates new growth. The little that occurs won't cut sharply into root reserves. So mowing at this time generally does not hurt stands.

However, other factors complicate the matter: Some growth on the field can help hold snow. Snow acts as an insulator, shielding the plants from cold. More important, snow helps to maintain even temperatures at the soil surface. This reduces the freezing and thawing that causes heaving. So, depending on the weather, the extra snow held by the alfalfa top growth may or may not help you this year.

On the other hand, too much rank growth standing in the field often makes good shelter for field mice. Overwintering field mice in University of Illinois test plots have severely thinned alfalfa stands in the past. Many farmers have had the same experience.

So the decision is up to you. Generally, late fall cutting or grazing does not hurt stands. If you need the feed, use it. Or if you are going to plow the field next year anyway, by all means harvest what you can.

However, if you have plenty of hay and silage and you plan to let the alfalfa stay down another year, leave the growth there. Fall growth is generally rather stubby. Late-cut alfalfa will probably yield less than you think. And it may help a little by holding the snow.

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If the growth is tall and rank, light grazing will make the field less desirable as a mouse haven, but still leave enough stubble to hold the snow.

One word of caution: If you grazed or cut your alfalfa in September or early October, leave it alone now. It needs every day possible to get some food down into the roots before winter so that it can produce well next summer.

But if you've let it grow and you're wondering what to do, "graze if you need it; otherwise leave it."

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CROPS AND SOILS

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URBANA

October 26, 1962

No. 220

SOYBEAN DAMAGE WIDESPREAD

Check your soybeans closely if you are holding them for sale or seed. Recent reports from southern and south-central Illinois indicate that many beans are green, shriveled, or moldy. Be particularly careful to check germination before saving your beans for seed. And if mold is present, do not try to store them, particularly if moisture content is above 12 percent, as further spoilage will follow.

Many southern counties reported the lowest quality beans harvested in many years. Some lots contained 25 to 50 percent of moldy beans at harvest time; many were 5 to 15 percent moldy. Other contained green, immature beans, which are likely to mold if stored. Shriveled beans were also common.

Unusual weather conditions, grasshoppers, hail, and disease all combined to produce these troubles. In some area dry weather in June caused soybeans to emerge unevenly and mature at different times within the same field.

Dry August weather in many southern and central counties caused beans to ripen prematurely, particularly on sandy soils or in dry spots in the field. Top beans on the plant dried out first. Hail and grasshoppers made small wounds in these beans before and during ripening. These wounds opened the way for disease organisms, particularly molds, to enter. Grasshoppers may have helped spread these infections.

Then rains came in September. The moisture caused molds to develop and spread. Wet weather also delayed combining, allowing molds to develop further. Two common soybean diseases, pod and stem blight and purple seed stain, contributed their part. Other mold types also moved in.

Varieties were not to blame. Those that were maturing when adverse conditions hit suffered most. Clark, the main variety in the affected area, apparently bore the brunt. But in some areas Clark came through well, while Harosoy and Shelby suffered. Grasshoppers, hail, and dry weather do not choose between varieties, and no variety is resistant to bud blight, purple seed stain, and pod and stem blight.

Many farmers did harvest good beans. For many, grasshopper control paid off. In several instances those who had controlled the hoppers harvested high-quality beans, while across the way the neighbor's beans were 10 to 15 percent moldy.

Damage seemed most serious in fields that were low in potash. This same tendency has been noted in past years. Plants under stress for nutrients are often most susceptible to disease.

If you are storing some of your crop, remember that it is best not to store lots that contain moldy beans unless moisture is below 12 percent. Otherwise, molds may develop and spread in storage, causing increased spoilage.

Be particularly careful of your seed beans this year. A germination test will be all-important, since many of these lots test low. It's best not to rely on seed treatment; it cannot revive a moldy bean or bring a dead seed back to life.

Farmers in southern and south-central Illinois should plan this year to buy certified seed. The assured high quality of certified seed will pay off. Do not gamble on your own seed this coming year, particularly if germination is seriously reduced because of moldy or shriveled beans.

If you want certified seed, get your order in early. Supplies will be short, particularly of varieties adapted to the southern half of the state. Demand for certified beans will be high because many farmers will not attempt to save seed from their own beans.

Even if your beans look all right, be sure to check germination before using them for seed. There is no profit in poor seed.

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AGRONOMY

CROPS AND SOILS

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URBANA

November 9, 1962

No. 221

SAFFLOWER NOT ADAPTED TO ILLINOIS

Although safflower is now a profitable oilseed crop in the western United States, it does poorly in Illinois. This crop requires low humidity and dry weather during flowering and ripening. Summer conditions in Illinois include too much moisture and humidity for profitable safflower production.

Safflower, a member of the thistle family, has risen to prominence because of the oil contained in its seed. This oil, useful in paints and varnishes, has lately come into strong demand because of its role in low-cholesterol diets.

Acreage of this crop has increased dramatically in the past few years, rising from a few thousand acres 10 years ago to several hundred thousand acres in 1962. However, all of this growth has been in the west, much of it in irrigated areas. For adequate seed set and high oil content, dry weather and low humidity are musts during flowering and ripening. Low humidity also helps to prevent the attack of a leaf spot disease that can drastically reduce both seed yield and oil content. This disease has been a major factor in limiting safflower production to the dry areas of the west.

R. O. Weibel, plant breeder at the University of Illinois, conducted safflower tests at the Agronomy South Farm during the period 1944-1950. The table below briefly summarizes the results. These data cover "common," the highest yielding strain included in the tests. Since 1950, western plant breeders have developed new varieties that have a higher oil content and yield. However, they are all designed for dry climates and not for the humid conditions of Illinois.

Safflower Results, Seven-Year Summary, 1944-1950
Agronomy South Farm, Urbana, Illinois

	<u>Average</u>	<u>Highest year</u>
Yield, pounds per acre	601	735
Percent of oil in seed	19.5	21.3

Note particularly the oil percentage. This figure is far below western levels, where oil content ranges between 32 and 40 percent. Note also the average yields. Yields in California average 1,700 pounds per acre, and 4,000-pound yields are common under irrigation. In the northern Great Plains, yields range from 500 to 2,000 pounds.

Illinois agronomists are continually looking for new crops that may benefit the farmers of the state. The successful introduction of soybeans is a prime example of what can be done. However, while some crop occasionally makes the grade, safflower apparently does not.

Weather conditions dictate the crops that can be grown in any area. Our summer rainfall and humidity are excellent for corn and soybeans, but for the present at least they rule out safflower.

For further information on safflower, send for USDA Farmers' Bulletin 2133.

Extra note:

Castorbeans, sesame, and guar, all oilseed crops, are receiving attention in various parts of the United States. Illinois agronomists have tested all three. Yields have been low, quality poor, and oil content unsatisfactory. At present, none of these crops appear sufficiently adapted to Illinois conditions. All do best under the low humidity and low rainfall of the far west.

Research is continually discovering uses for new crops and new uses for old crop species. Illinois agronomists will continue to check each possibility as it develops to keep Illinois farmers informed of any crop that may have a profit potential.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

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November 23, 1962

No. 222

CHEMICAL ROTATIONS

For many years agronomists have recommended crop rotations to make the best use of our soil. Now that herbicides are readily available and widely used, it's time to start thinking of chemical rotations. They make the best use of your chemical weed killers, fitting each into your farming operation to best advantage.

First of all, fit the herbicide to the crop. Properly applied pre-emergence herbicides like atrazine and randox or post-emergence 2,4-D will control weeds in corn. For soybeans, use pre-emergence chemicals like amiben, alanap, and randox. With small grains, MCP will help. With such a variety of chemicals, you can rotate herbicides along with the crops.

You can control more species of weeds by bringing several chemicals into use. For example, randox controls grass well but does a poor job on most broad-leaved weeds. The opposite is true of 2,4-D. It kills broad-leaves but not grasses. Amiben does a good job on most weeds in soybean fields but does not kill morning glory. On the other hand, 2,4-D easily kills morning glory when the field is in corn.

For help with Johnson grass, call on dalapon; for Canada thistle, amitrole. 2,4-D leaves wild cucumber, but 2,4,5-T will kill it; corn tolerates the two chemicals about equally well. So, to clean up the different kinds of weeds, take advantage of the various chemicals, and rotate them.

Then there's this matter of soil residues. This has not been a problem with the more soluble chemicals like randox and 2,4-D. But this year there were more cases of atrazine carry-over and damage to oats and soybeans following corn than ever before in Illinois. There were many reasons, but the fact remains that when you use a relatively insoluble chemical, such as atrazine, on corn one year you risk the chance of carry-over and damage to oats and soybeans planted in that field the next year.

Avoid this problem by using atrazine on corn to be followed by corn next year. Use randox or other control measures on corn that precedes small grains or soybeans. Here again it's best to rotate the chemicals.

There are many good herbicides to help you in your fight against weeds. Take full advantage of them. Rotate them.

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AGRONOMY

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ALFALFA VARIETIES FOR 1963

Three new alfalfa varieties have joined the Illinois recommended list for 1963. All three have performed well in agronomy department test plots. Each may fit a specific role on your farm.

Cody, a new Kansas variety, is recommended as an alternate to Buffalo. It yields as well as Buffalo and has the same winter-hardiness and disease resistance. During 1963, seed supplies of Cody will probably be plentiful and favorably priced. Buffalo, on the other hand, is in very short supply. If you have liked Buffalo, Cody provides an excellent alternative.

FD-100 is a new variety similar in yield and performance to DuPuits and Alfa. It is early maturing, fast recovering, and somewhat tolerant of insect and leaf diseases. Agronomists recommend FD-100 for use in short rotations where alfalfa will stay down for only one or two harvest hay years. It is similar to DuPuits and Alfa in susceptibility to bacterial wilt. This disease may kill it out in the third harvest year but will do little harm before that time.

Plan to harvest FD-100 early. Like DuPuits and Alfa, it starts early, grows fast, and matures early. Quality will fall off if you delay harvest into June.

Moapa is recommended as a catch crop for plow-down. It lacks winter-hardiness, so don't plan on it for a hay or pasture crop. Like the non-hardy alfalfas, it does not become dormant in the fall, but keeps growing vigorously until freeze-up. Certified seed of Moapa is available and favorably priced and should be first choice for plow-down.

Varieties recommended for Illinois now include three types of alfalfas. DuPuits, Alfa, and FD-100 will give top yields of hay or pasture for one or two years. Vernal is outstanding for short or long rotations, while Buffalo and Cody do well in southern Illinois. Ranger can be grown anywhere in Illinois, but newer varieties are superior.

For plow-down the new Moapa does well, as do the common alfalfas, both non-hardy and hardy.

Alfalfa varieties differ. Choose the one that fits your needs. And plant a recommended variety; the value of increased yields will far exceed any extra seed cost. Cheap seed brings trouble; good seed brings profits.

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AGRONOMY

CROPS AND SOILS

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January 11, 1963

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PLAN AHEAD FOR AN EFFICIENT FARM BUSINESS

In the farming business, success develops from long-range planning. And your soil is your most important business asset. With good planning and management, you can preserve your soil in top condition, maintain high productivity, and insure satisfactory income.

The Illinois Soil Survey makes soil maps, soil survey reports, and other materials that are excellent guides to efficient soil management. From soil maps, you can find the exact location and number of acres of each kind of soil on your farm. From soil survey reports and soil management guides, you can learn about the physical and chemical properties of your soil, such as air and water permeability, available water-holding capacity, natural fertility, potential productivity, tendency to erode easily, need for drainage, and the behavior of soils under various kinds of tillage.

Knowing these things will help you plan cropping systems that best fit each field, as well as programs of liming and fertilizing, drainage and erosion control. They are helpful in deciding what tillage practices should be used in each field and what crops are likely to be most successful. For example, pasture crops or trees are likely to be better adapted to soils that are strongly sloping and eroded, or to sandy soils that are drouthy, than crops like corn.

Here are some tips on four important points that you should consider in your soil management program:

Erosion Control. Your soil map and the soil data in your soil report will help you decide what erosion control practices--strip cropping, contour strip cropping or terracing, etc.--are needed. They will also help you decide what cropping system will best fit with the practices you decide to use to keep the soil from blowing or washing away.

Erosion can never be completely controlled. But it can be reduced to the point where soil losses won't reduce soil productivity. Then you can safely use the soil for crop production. The Soil Conservation Service, which has work unit offices in almost all counties, can help you decide the best way to manage your soil to control erosion. Using a good erosion control plan helps to keep the soil in good physical condition, makes it more porous to water, and thus aids in conserving water.

Planning Fertility Programs. Soils differ naturally in their need for lime. Some are acid; others are alkaline or "sweet." They differ also in their ability to supply nitrogen, phosphorus, and potassium as well as micronutrients like manganese. But during the years that your soils have been growing crops, you've changed their natural condition by the treatments you've given them.

Knowing your soil's natural characteristics and its past treatments, together with a good soil test program and a soil map to pinpoint your fertility needs, will help you plan for top yields through the efficient use of fertilizer and lime. Your farm adviser has publications and information on personal experiences in your area that will provide excellent help in planning your fertility program.

Cropping Systems. Soil characteristics, such as slope, drouthiness, and erosion tendency, help to determine which crops are best suited for the land. Because sloping soils erode more easily than level soils, they need to have more hay and pasture crops included in the cropping system. Soils that are already badly eroded may be suitable only for pasture or trees. Sandy soils may be drouthy even in years of plentiful rainfall. They're best suited to crops that use the available moisture very efficiently.

Your soil map and your soil survey report or soil management guide give valuable information that will help you select the correct system for your farm. With them, the Soil Conservation Service can help you plan a good cropping system on your land to control erosion, make the best use of available moisture, and maintain the productivity of your soils.

Drainage. Soils differ in drainage needs, depending on how deep the water table is and whether they are sloping or level or receive much run-off from upland areas. Their permeability to water and their clay content often determine whether you can drain them with tile or whether some system of surface drainage is better.

Soil maps can help you find the location and number of acres of each area on your farm that needs draining. Soil Survey reports give information about soils that will help you plan a practical and efficient drainage system for each poorly drained area on your farm. Engineers from the Soil Conservation Service or the University of Illinois Department of Agricultural Engineering can also help you plan a program of soil drainage.

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CROPS AND SOILS

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February 22, 1963

No. 225

1963 CROP VARIETY RECOMMENDATIONS FOR SPRING PLANTING IN ILLINOIS

Illinois agronomists test hundreds of varieties each year in order to find those that will do the best job for you. Only those that are outstanding are added to the recommended list. Are you planting recommended varieties?

To be recommended, a variety must measure up in many ways. It must be high-yielding, of course. It must have standability, disease and insect resistance, and the right maturity. And it must be dependable from year to year and from county to county.

No variety is perfect in all respects, but the following recommended varieties come closest to meeting Illinois conditions. Here's an at-a-glance summary of the crop varieties recommended for spring planting in Illinois in 1963:

Northern Illinois

Central Illinois

Southern Illinois

Oats

Beedee
Clintland 60
Dodge
Garland
Goodfield
Minhafer
Newton
Shield

Clintland 60
Garland
Goodfield
Minhafer
Newton
Putnam 61

Minhafer
Newton
Putnam 61

Soybeans

Chippewa
Lindarin
Harosoy
Hawkeye
Adams

Lindarin
Harosoy
Hawkeye
Adams
Shelby
Clark

Adams
Shelby
Clark
Kent

Red Clover

Lakeland
Dollard
Illinois Common

Kenland
Illinois Common

Kenland
Illinois Common

Alfalfa

Short Rotations
(1-2 Harvest Years)

Short or Long
Rotations

DuPuits
Alfa
FD-100

Vernal
Cody
Ranger
Buffalo

Spring Barley

(Northern Illinois Only)

Traill
Kindred

Above all, buy your seed from a seed dealer whom you know and can trust. Avoid the "fly-by-night" salesman. Buy from a dealer who takes pride in selling good seed--not from one who sells "cheap" seed.

Cooperative Extension Service, College of Agriculture, University of Illinois
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AGRONOMY

CROPS AND SOILS

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No. 226

DO MICRONUTRIENTS PAY ON CORN?

Can micronutrients increase your corn yields and profits? University of Illinois agronomists say the answer is not simple.

Micronutrients are chemical elements required by plants in extremely small quantities. Sometimes called trace or minor elements, they include boron, chlorine, cobalt, copper, iron, manganese, molybdenum, and zinc.

Micronutrient deficiencies can easily be created when plants are grown in greenhouse pots under nutrient culture. But out in the field the situation is not so clear-cut. While some soils may be deficient in one or more micronutrients, most soils contain enough of them and some contain large quantities. Results of many field trials provide some answers on the subject, but more are needed.

Agronomists know that serious deficiencies occur only (1) in badly weathered soils like those found in areas of the southern United States, (2) in alkaline soils found primarily in areas of lower rainfall, (3) in sandy soils, and (4) in organic soils. Of these, only the sandy soils occur to any extent in Illinois.

Even when deficiencies occur, the soil rarely lacks more than one element. For this reason "shot-gun fertilizers" containing all micronutrients are costly remedies. And even when deficiencies occur, University of Illinois agronomists say it's cheaper to apply only the needed element rather than all of the micronutrients.

Nitrogen, phosphorus, and potassium are still the most important nutrients for fertilizing corn. When even one of these is short, no amount of micronutrients can increase yields. Unless you're already getting yields far above average, you will generally be far ahead to put your money into these tried-and-proven plant foods.

In buying micronutrients, it's hard to know what you're getting. State laws require that the label on the fertilizer bag guarantee the contents of nitrogen, phosphorus, and potassium. At present no such labels are required concerning micronutrients in Illinois.

Interest has recently centered on zinc and boron for corn. Last year Illinois agronomists tested the effects of these two chemicals on corn at seven state locations. Test sites ranged from DeKalb county in northern Illinois to Dixon Springs in the south.

The agronomists first applied a liberal amount of 12-12-12 to all plots to meet soil needs as shown by soil tests. Then they applied zinc--as zinc sulfate--to some plots, boron--as borax--to others, and then tried both together. Untreated

plots served as checks. While results were inconclusive, neither boron nor zinc caused a significant yield when applied together. The agronomists also checked corn leaf samples and analyzed them chemically. They found that corn leaves from the untreated plots contained as much zinc and boron as leaves from the treated plots. Apparently even the untreated soil supplied enough boron and zinc for the corn plants.

Some micronutrients are available in chelated or combined forms that could possibly make them more easily available to plants. In tests at Urbana, agronomists found no response to chelated micronutrients on either corn or soybeans.

Despite these trials, the micronutrient picture is still cloudy. Agronomists in Illinois and other corn-belt states generally find little if any corn yield response from these nutrients. But results remain inconclusive and exceptions occasionally crop up. More research is needed, first to pin down specific soil areas where deficiencies exist and then to determine the right application of specific micronutrients. Agronomists need this information from further research before they can help you decide whether it will pay to apply micronutrients on your corn.

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AGRONOMY

CROPS AND SOILS

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March 25, 1963

No. 227

PRE-EMERGENCE HERBICIDES--GRANULAR OR LIQUIDS?

You can apply pre-emergence herbicides either in dry granular form or as sprays. But before you buy either, here are some facts to consider:

This year you can buy Radox, Radox-T, 2,4-D, Amiben, and Alanap as liquid concentrates. You then dilute them with water for spray application. Or you can buy Atrazine or Lorox as wettable powders, to which you also add water. These chemicals are also available as granulars. Sodium PCP is available as a beaded material. You can apply it dry or dissolved in water.

University of Illinois weed control specialist Ellery Knake suggests that you consider the following factors before making your decision:

Advantages of Sprays

Test results. Research shows that granules generally kill weeds just as well as sprays when both are applied properly.

Cost. Granules generally cost about 60 cents more per acre than sprays. That's \$24.00 on a 40-acre field.

Calibration. It's easier to calibrate spray applicators accurately. Humidity can change rate of flow of granules. Some farmers report that they have to check the calibration of their granular applicators several times daily. And this means calibrating two or four boxes. Generally, if a sprayer is working properly, you need to check only one nozzle. Once it's set, it will hold relatively constant.

Uniformity. You can apply sprays more uniformly than granules, particularly on rough seedbeds or where you're using minimum tillage. Here granules tend to roll into the low spots.

Advantages of Granules

Convenience. Granules are easier to apply than sprays, since you don't need to haul water.

Irritation. Granules are definitely preferred when chemicals are irritating to the user, like Radox and Radox-T. Granules will not eliminate irritation, but they will reduce it.

Soil residues. Last year most Atrazine carry-over damage occurred where farmers had used granules the previous year, so with Atrazine it's best to use the wettable powder. If you use granular Atrazine, get the 10 rather than the 20 percent formulation. You'll handle a little more material, but it's less concentrated and therefore easier to apply uniformly.

Compare these findings with your own experience. Granulars and sprays can both control weeds. Choose the form that best fits your farm operation.

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AGRONOMY

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March 29, 1963

No. 228

RAINFALL AND YIELDS

Have you ever wondered why a crop variety is sometimes outstanding one year but only "average" the next? One cause can be the timing of summer rains. The time when rain falls can affect crop yields nearly as much as the amount that falls.

Each year agronomist P. E. (Pat) Johnson harvests soybean variety trials on experiment fields at Newton, Oblong, Toledo, and Brownstown in south-central Illinois. He also keeps accurate rainfall records at each of these locations. His 1962 results show the close connection between rainfall distribution and variety yields. They also emphasize the fact that one year's results at one location can often be misleading.

Yield records over a number of years show that the later maturing varieties, Clark and Kent, are generally the highest yielding varieties in this area of Illinois. True to form, these varieties had the highest average yields in these four trials last year. But let's look at the individual tests. Table 1 shows the yield results at these four test sites.

Table 1. 1962 Yields at Soil Experiment Fields
in South-Central Illinois

Varieties	Newton	Oblong	Brownstown	Toledo	Average
bushels per acre					
Harosoy	28	27	26	21	26
Adams	28	27	26	23	26
Shelby	30	32	22	23	27
Clark	32	36	25	21	28
Kent	34	38	24	22	29

At Newton and Oblong, Clark and Kent outyielded all others. Earlier varieties like Harosoy and Adams yielded 7 to 10 bushels less.

At Brownstown the situation reversed itself. Here Harosoy and Adams topped the list, with Kent and Clark several bushels behind. At Toledo a third pattern occurred. Here all varieties produced low yields, with little difference among them.

Rainfall record is clue. Rainfall records for each field give the clue to differences in performance. Those for 1962 are shown below in Table 2.

Table 2. Summer Rainfall in Inches, 1962

Month	Newton	Oblong	Brownstown	Toledo
June	5.05	*	4.17	4.10
July	1.89	*	4.03	.84
August	5.18	*	2.18	4.25

*While there are no rainfall records for Oblong, it had about the same pattern as the Newton field.

At Newton and Oblong, rainfall was adequate throughout June, July, and August, and varieties performed true to form. Each had good pod set and matured normally.

At Brownstown things were different. More than four inches of rain in July stimulated good pod set on all varieties, but a very dry August followed. The little rain that fell came in small showers that did little good. Plants wilted and dried prematurely. Harosoy and other early varieties began maturing ahead of the dry weather and made a nearly normal crop. Late-maturing varieties like Clark and Kent were caught before their pods had filled, and their yields suffered.

What happened at Toledo, where all yields were low? Here records show less than an inch of rain in July. This dry period reduced pod set on all varieties. Rainfall was adequate in August, but the harm had been done. Too few pods were present to give good yields. Then late summer rains also added to the problem by preventing normal ripening.

No one can predict the weather next summer. Your best bet is to plant varieties that have the highest yield record over several years. As these yields show, one year's results at one location cannot tell the whole story.

Whatever crop you are planting, check the Agronomy Department recommended list before selecting your seed.

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AGRONOMY

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No. 229

SOIL COMPACTION BY FARM MACHINERY

Most Illinois farmers have a traffic problem. But it's not in town or even in the farm yard; it's right out on the land. Bigger and bigger tractors power heavy equipment across the fields, causing greater pressures and often severely compacting the soil below. The worst offenders are heavily loaded vehicles, such as fertilizer and lime trucks, not designed to operate over farm land. Their small wheels concentrate pressures in a small area, often producing deep compaction.

One major effect of soil compaction is to close the large soil pores. Most of the soil water moves into the soil through the larger pores under force of gravity. When large pores are closed by compacting, water movement is restricted to the small capillary pores. Water moves very slowly when the main force is capillary tension. Since less water is able to move into the soil, compaction increases runoff and in turn increases soil erosion.

Also, compacted soils hold water longer. Therefore, compaction reduces soil aeration. Atmospheric oxygen has difficulty in replacing the carbon dioxide produced in the soil by plant roots and microorganisms. Severe waterlogging can impair root growth and decrease crop yields.

Compaction can also physically block root growth. Roots cannot enter soil pores that are smaller than their tip diameter. The roots tend to spread along the top of the compacted layer until they find a crack large enough to enter. Roots growing through cracks in a compacted layer won't spread out until they reach a less compacted zone.

Proper fertilization can increase the capacity of the roots to overcome soil compaction. The increased use of limestone and fertilizer has probably masked many of the detrimental effects of soil compaction.

The degree of compaction under a given stress depends on the resistance a soil exhibits. The resistance depends on the soil's texture and moisture content. The higher the organic matter content, the more the soil can resist compaction. Coarse-textured soils are less resistant than fine-textured soils to compaction.

As a soil gets wetter, it also becomes more easily compacted, up to the point where it becomes so full of water that it resists further compaction by a given load. Unfortunately, most soils are subject to maximum compaction at the same moisture content that is best for plowing.

Surface compaction produced in the dry soil is not so serious as the deeper compaction produced by the passage of heavy machinery over wet soils. Surface compaction will be removed during succeeding tillage, by freezing and thawing, by the growing of plant roots, and by wetting and drying. It is the deep compaction that is serious, particularly that reaching below the plow level.

To avoid deep compaction, wheel pressures should not exceed 35 to 40 pounds per square inch of soil surface when soil moisture is normal, and should not be more than 15 to 20 pounds per square inch when soil moisture is above that at which the soil plows best. The rear wheels of average-sized agricultural tractors exert pressures of 15 to 40 pounds per square inch, depending on tire width, diameter, ply rating, and inflation pressure. Other types of vehicles exert the following pressures: passenger cars, 25 to 35 pounds per square inch; light trucks, 35 to 65 pounds per square inch; and heavy trucks, 45 to 100 pounds per square inch. When these vehicles are heavily loaded, the wheel pressures far exceed the maximum safe pressure of 40 pounds per square inch.

When larger farm tractors exceed the maximum safe wheel pressure, adding extra wheels will spread the total pressure over a larger area and thus reduce the unit pressure under the tires. The unit pressure increases the size of the surface zone of compaction, but the zone is shallow and therefore not so permanent as in the deeper compaction.

Since 90 percent of the compaction is produced during the first passage of a wheel, tandem hitching of tractors is another way to relegate more of the dense compaction to the plow layer without increasing the width of the compacted zone. Several mechanical disadvantages discourage the use of larger diameter tractor wheels, and the trend toward narrow rows limits tire widths. Hitching smaller power units together to obtain the desired total power therefore seems to be a logical means of preventing deep soil compaction.

Various systems of minimum tillage can also help in reducing compaction. During the fall and spring, when soils are normally wet, the fewer times you move big equipment over your fields, the better your crops will grow.

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April 4, 1963

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RESULTS OF 1962 SUGAR BEET TRIALS IN ILLINOIS

In looking for new crops, some Illinois farmers have become interested in sugar beets. Can we produce sugar beets in Illinois? Last year in this newsletter we commented that political and economic factors were probably more important than the agronomic aspects.

Sugar beet production is strictly controlled by the federal government. Acreage quotas are allotted to sugar companies, who then contract with farmers for the beets they need. No sugar beets are sold on the open market; all are produced under contract.

At present, Cook county vegetable growers grow several thousand acres of sugar beets under contract for sugar plants in Wisconsin and Michigan. This acreage has been declining in recent years, primarily because of difficulties in transporting the beets to the processing plants. There are no sugar refineries in Illinois.

Sugar beets are bulky. It costs to ship them long distances. Sugar beet production is feasible only when it's close to a sugar refinery. Before a sugar refinery would move into Illinois, two things must occur:

First, some area in Illinois must receive an acreage allotment. The present sugar act calls for some additional acreage to be allotted during the next four years. States from Maine to Arizona are competing actively for these allotments, and there is not enough acreage to go around. Illinois prospects appear dim until 1967, when the sugar act will be up for renewal. Additional allotments may be granted at that time.

A sugar company must then decide that it will be profitable to build a plant here. Sugar refineries cost 8 to 10 million dollars. Even with an allotment no company will spend this money unless it will be worth while. One sugar company has expressed interest in the Wabash valley of southern Illinois and Indiana, but it will certainly consider all aspects thoroughly before moving in.

Interest has centered in the Wabash valley because of its mineral resources, as well as its soils. Sugar refineries consume large amounts of coal and limestone. Both occur abundantly in this area.

How about production? Last year Illinois agronomists W. D. Pardee and P. E. Johnson tested three sugar beet varieties at 17 locations in southern Illinois. County farm advisers and leading farmers cooperated in these trials.

Pardee and Johnson wanted to see whether adequate tonnages of beets with sufficiently high sugar content could be grown in the area. Sugar beet companies pay for sugar yield, so high beet tonnage is worth little if sugar content is low.

In these trials, beet yields averaged over 14 tons per acre, with the top yield above 30 tons. Most plots ranged between 12 and 16 tons per acre. This yield compares with average yields in the present beet-growing areas. But it's far below yields obtained by the better producers.

Sugar content averaged 14.3 percent in U. of I. tests, with some plots yielding 16 to 17 percent sugar. This percentage also compares favorably with the average in beet-growing states, but it is well below top levels. Recent reports from Arizona trials show that their yields average 33 tons of beets per acre with 19 percent sugar.

Insects, diseases, and weeds added problems in the Illinois trials. Drouth seriously reduced yields in several plots. Highest yields were obtained under irrigation. Drouth presents a serious hazard in sugar beet production. If farmers in this area ever produce beets commercially, they may well have to irrigate.

On the basis of last year's "respectable" yields, Pardee and Johnson plan tests in 1963 to investigate further yield-increasing factors.

But even if sugar beets grow well in Illinois, prospective beet growers need both acreage allotments and a sugar refining plant. So sugar beet production in the state must remain only a possibility for the future.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

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April 8, 1963

No. 231

WHAT ABOUT SINGLE-CROSS CORN HYBRIDS?

Single-cross corn hybrids have come to Illinois. Some are excellent; others are not. There is nothing magic about the term single cross. In fact, in selecting hybrids for your farm, you should evaluate a single cross even more critically than you do conventional four-way hybrids.

First, what is a single cross? Single crosses differ from other hybrids in having only two inbreds as parents rather than the four used for normal double-cross hybrids. Actually, a conventional double-cross hybrid comes from the cross of two single crosses.

What advantages do single crosses have? One gain, certainly, is uniformity. There are smaller differences between individual plants. Many single crosses have high eye appeal due to their uniformity in height, ear placement, maturity, and general appearance.

Of course, uniformity can be a disadvantage too. If growing conditions favor a single cross, it may do uniformly well; but if they're unfavorable, it may do uniformly poorly. In past years several single crosses have been susceptible to stalk rot, making them poor standers. When hit by winds late in the season, all plants can fall over--uniformly.

Do single crosses yield better than four-way hybrids? Not necessarily. It's true that if you put two outstanding hybrids in a single cross, it may outyield a double cross made up of four average inbreds. On the other hand, if you put four superior inbreds in a double cross, it should beat out a single cross made up of average inbreds. The performance of a hybrid, either single cross or double cross, depends on how good its parents are--not just on how they're crossed.

Let's look a little closer at a normal four-way hybrid. It is made up of four inbreds--let's call them A, B, C, and D. With these four inbreds we can make six possible single crosses, A x B, A x C, A x D, B x C, B x D, and C x D. Let's



Corn breeder E. R. Leng compares the uniformity of single-cross ear size with the variability of a standard double cross.

say that one year we produced seed of all six single crosses, as well as the double cross $(A \times B) \times (C \times D)$. If we planted them the next year, we'd probably find that one or more of these single crosses outyielded the double cross--maybe by 10 percent or more. Then, if we did it again the next year, we'd find the same thing--at least one single cross would probably beat out the double cross. But it might not be the same single cross that had done it the year before. The double cross with a wider parental base will generally vary less from year to year in yield than single crosses made from the same inbreds, and its long-term average yield could be higher.

However, as we said before, it's the parents that count. And several single crosses are available that have outstanding yield records. They compare well with the best double crosses and often outyield them. But the reason is that they have outstanding inbreds as parents. Their single-cross uniformity does add eye appeal. This feature doesn't help yield, but it has meaning to the farmer who takes special pride in the appearance of his crop.



Single crosses can have small ears too, extension agronomist W.D. Pardee points out. Note those of the single cross in the center.

Why haven't we had single crosses before? Actually, single crosses have been available for years, but they have presented severe problems in seed production. In a true single cross, the seed parent is an inbred. Inbreds usually produce puny plants and are poor seed yielders. Seed grading is also difficult, as only a small proportion of the kernels fall in the desirable grades.

Corn breeders have overcome this fault in two ways: Some have developed inbreds that set a higher number of desirable kernels per ear. Others are working with so-called sister-line crosses. Here a corn breeder selects two slightly different types out of one inbred or develops two very closely related inbreds. Once the breeder has these two closely related lines, he can then cross them. This sister-line cross may have some hybrid vigor, at least enough to make it a feasible seed-parent for a commercial single cross. A male parent, too, may be produced from single-line crosses to make a more vigorous pollen producer.

Despite the use of such sister lines in each parent, resulting hybrids technically are still single crosses, though they're not exactly what the early corn breeders were considering when they coined the term.

Even by such methods, single-cross seed is still more costly to produce. Inbreds or sister-line crosses both yield far less than the single crosses normally used to produce seed for double-cross hybrids. So you'll pay considerably more for single-cross seed.

Some farmers ask whether there is any danger that a single cross will not produce enough pollen to fertilize its own silks. Actually, there is probably no such danger in the single crosses commercially available today. Corn breeders are well aware of this possibility and test carefully to obtain hybrids that "nick" well, releasing enough pollen when the silks are ready. A single barren field could severely damage a seed company's reputation, and none would knowingly sell a hybrid that has this danger.

Single crosses are here to stay. But look them over carefully. There's nothing magic about a single cross. It's the grain in the bin that counts. Several excellent single crosses are available, particularly for central Illinois. But there can be poor single crosses too. And, of course, outstanding double crosses are also available from many companies.

Evaluate the two in the same way. Check their yield and see how they stand and how they dry down.

A good source of information is Circular 859, "Performance of Commercial Corn Hybrids in Illinois, 1960-1962," giving the results of Agronomy Department tests at eleven locations in the state. Most commercially available single crosses are included. Check their performance in these tests. Then, if you wish, try them out on your farm to see how they do. And don't rely solely on one year's results; try them for several years side by side with other hybrids. After all, the final test is how much grain they put into your crib.

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AGRONOMY

CROPS AND SOILS

NEWS

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April 10, 1963

No. 232

REDUCED TILLAGE ON FALL-PLOWED CORN LAND

As a result of good weather last fall, Illinois farmers completed about 40 percent of their plowing. With this much of the job already done, many farmers can greatly reduce their surface tillage this spring. If you were able to do a good job of plowing last fall, you may need very little soil preparation before corn planting time.

In the minds of many farmers, the primary objectives of further surface tillage of fall-plowed land are to control weeds and to improve the seedbed by smoothing and firming it.

Let us look first at the matter of early weed control. Most annual weeds do not begin to germinate until soil temperatures are around 50° F. at a depth of three or four inches. Average daily soil temperatures reach this point about the middle of April in central Illinois, somewhat earlier in the southern area, and later in the northern part of the state. So the real flush of early weed growth germination does not come until late April or early May. Therefore, additional surface tillage cannot be justified from the standpoint of destroying weeds unless it is performed just before planting. For late-planted corn, additional tillage may be necessary; but for early-planted corn on fall-plowed ground, one surface tillage operation just before planting should be sufficient.

Pulverized and compacted seedbeds may be ideal for seed germination, but they are not always best for later plant growth. Compacted seedbeds may hasten speed of germination, but they can decrease yields. Too many surface tillage operations destroy the desirable granulation produced by the plow. As the soil is compacted and pulverized, water infiltration is reduced, causing increased runoff and soil erosion on sloping land. On the other hand, coarse granules can withstand the impact of raindrops and hold an open structure necessary for rapid movement of water through the soil surface for fast drainage and good soil aeration.

Fall-plowed land will have settled into an adequate state of firmness by corn-planting time. All that is usually needed for corn planted by early May is one disking to destroy any weeds that may be growing. On the other hand, loose spring-plowed land usually needs some firming of the seedbed. But it's best to restrict the firming to the row, leaving the middles rough and loose. That is the aim of all minimum-tillage systems.

In planning to prepare your seedbed and control weeds, remember that a corn kernel is about four times as large as the average weed seed. Therefore you can plant corn two to three inches deep in the soil where it has a good chance of picking up moisture for germination. On the other hand, tiny weed seeds must germinate at the soil surface. If this surface is rough and loose, weeds will have difficulty reaching the water they need for germination.

If you find that it is necessary to disk well ahead of planting to control weeds, you can avoid an additional disking by using cultivators at planting time. Cultivators lift and loosen the soil surface, whereas the disk harrow produces compaction below the depth at which it moves the soil. Often this "disk pan" is a very thin, compacted layer but, even so, it can determine the rate at which water moves into and through a permeable soil. The fewer times you disk, the better your soil tilth will be throughout the growing season.

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COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 12, 1963

No. 233

HAVE YOU TRIED "SUPER-SWEET" CORN?

Basic research, aimed at discovering the fundamental processes of living things, sometimes turns up unexpected benefits. No better illustration exists than the new "Super-Sweet" strains of corn. Formerly just a genetic curiosity, this type of corn has opened up new taste horizons for sweet corn lovers.

Hybrids carrying this new trait are twice as sweet as normal corn at harvest time and four times as sweet 48 hours after picking. This increased sweetness is due to a single inheritance gene called "shrunk 2." Corn breeders have worked with this gene for many years.

Several years ago University of Illinois researcher John Laughnan found that corn carrying this gene made mighty good eating. Not only was it sweeter than normal corn at picking time, but it remained sweet for days after picking.

Examining the sugar content, he soon found the reason. Normal sweet corn contains about 20 percent sugar in the kernel at picking time. This sugar changes rapidly into starch once the corn is picked. Kernels with the shrunk 2 gene contain over 40 percent sugar at picking time. And the main sugar that is present, sucrose, is the sweetest tasting member of the sugar family. Normal sweet corn has a higher proportion of glucose, not so sweet tasting as sucrose.

The higher content of sucrose explained the extra sweetness, but not why the kernels remained sweet. Searching further, Laughnan found that, like all corn kernels, those with the shrunk 2 gene converted sugar to starch. But they made the change-over slowly. The enzyme system responsible for this conversion was less efficient than that in normal sweet corn.

Laughnan then began to incorporate this gene into normal sweet corn inbreds. These were used to produce "Super-Sweet" sweet corn hybrids.

Even though seed supplies have been limited until now, many people have tasted "Super-Sweet" corn. They are almost unanimous in their approval. Already "Super-Sweet's" fame is spreading and favorable comments are coming in from all over the nation.

But there are some problems with "Super-Sweet" lines. The shrunk 2 gene causes a shrunk seed. Good seed is difficult to produce, and high quality is difficult to maintain.

Seed is light weight and plants emerge slowly. These factors present problems to the large sweet corn producer who must plant by machinery and who needs thick, even stands. But the home gardener, with a little care, can produce fine yields of tasteful sweet corn.

In growing "Super-Sweet," be sure to plant the seed in a warm, well-prepared seedbed. Sow in blocks at least four rows wide to reduce contamination from pollen of other corn types. Even pollen from other sweet corn causes "Super-Sweet" to lose its sweetness.

This year, for the first time, substantial seed supplies are available. For information on obtaining "Super-Sweet" seed, write to Illinois Foundation Seeds, 107 North Fifth Street, Champaign, Illinois. Several commercial companies also have limited supplies for 1963 planting.

Basic research, prying ever deeper into life processes, continues to discover new benefits for mankind. "Super-Sweet" corn, a product of basic research, may change our whole concept of sweetness in sweet corn.

Cooperative Extension Service, College of Agriculture, University of Illinois
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UNIVERSITY OF ILLINOIS

URBANA

April 15, 1963

No. 234

EARLY CONTROL BEST FOR EARLY WEEDS!

Weeds cost money. And the worst culprits are the early weeds, those that start growing along with your crop. It pays to control these weeds, and the earlier the better.

Early control helps most in fighting grasses growing in the rows, which are often difficult to control once they get started. Post-emergence 2,4-D won't hurt these grasses, and cultivation may not do the job.

Rotary hoeing kills early weeds quickly and economically. Start just after the weed seeds have germinated--when you find little white seedlings below the soil surface. By operating your tractor at 6 to 8 miles per hour, you can do an effective job in a short time. Rotary hoeing becomes less effective as weeds begin to grow above the soil surface and become well established.

Shovel cultivators are still the cheapest and most practical means of controlling weeds between the rows. By cultivating early and adjusting shovels properly, you can kill many small weeds in the row by covering them with soil.

More and more farmers are turning to pre-emergence herbicides to get better control of weeds in the row. Applied at planting time, these chemicals can control annual grasses, such as giant foxtail. Some of them help to control broad-leaved weeds. Herbicides can also control weeds early when wet weather makes timely cultivation impossible. Look for help from pre-emergence herbicides if you've had a serious weed problem or if you expect one.

Post-emergence application of 2,4-D in corn controls many broad-leaved weeds cheaply and effectively. For greatest effectiveness, spray early; weeds are easiest to kill when they are small and tender.

For broadcasting, use 1/2 pound of the amine form or 1/4 pound of the ester form of 2,4-D per acre. If you use a product that contains four pounds of 2,4-D per gallon, it has one pound per quart or 1/2 pound per pint; therefore you will need one pint of the amine or 1/2 pint of the ester form to treat an acre. Don't use the ester form of 2,4-D where it may endanger susceptible crops. Some farm liability insurance policies do not cover crop damage caused by the ester form of 2,4-D.

Weeds can be controlled. Give them both barrels by combining chemical and cultural methods. Most important--get the job done early!

In 1962 4-(2,4-DB) received label clearance for use as a post-emergence treatment in soybeans. However, if you use higher than recommended rates, you can injure your soybeans, and at recommended rates 4-(2,4-DB) does not control most weeds adequately. It can control cocklebur and may be helpful on bottom-land areas with serious cocklebur infestations.

Flame cultivation can kill weeds if you start when the weeds are very small and repeat the flaming several times. Corn plants 12 inches or taller appear to have fairly good tolerance to properly applied flame. However, flame cultivation requires more trips over the field, is less dependable for killing weeds, presents more chance of crop injury, and requires a greater investment in equipment than our present weed control methods. It is not likely to become popular with Illinois farmers.

Linuron (Lorox), a relatively new herbicide, can be applied when corn is at least 15 inches high and weeds are less than 8 inches. Under favorable conditions it can kill grasses as well as broad-leaved weeds. Corn does not have good tolerance to this chemical. Therefore, it is very important that the spray be directed to keep it off the corn and on the weeds. Results with this chemical have been erratic; Illinois agronomists will continue to test it in 1963.

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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

April 16, 1963

No. 235

AVOIDING SOIL RESIDUES WITH PRE-EMERGENCE HERBICIDES

To kill weeds, pre-emergence herbicides must be in the upper 1 or 2 inches of the soil surface with the germinating weed seeds. And the chemical must remain there long enough to be effective. However, if the chemical stays in the soil too long, it can endanger other crops the following season.

Some herbicides, such as 2,4-D and Randox, break down rather rapidly and present no problem. Others, such as atrazine and Randox-T, may last longer.

Chemical persistence depends on many factors, such as the solubility of the chemical, its rate of breakdown, and the amount of leaching that occurs. Some chemicals vaporize rapidly or are deactivated by soil organisms; others may be absorbed and held by the soil. Temperature, wetting and drying, and the physical and chemical properties of the soil determine how fast these processes occur.

Most soil residue problems have occurred with Randox-T and atrazine. A few cases of injury to beans have been observed where Randox-T was applied to corn and the field was planted to soybeans the following year. Manufacturers of Randox-T have changed the formulation to lower the content of "T," and in 1962 there were few cases of injury.

Cases of injury to oats and soybeans from soil carry-over of atrazine were more evident in 1962 than ever before in Illinois. More than 200 cases of injury to oats and more than 100 to soybeans were reported. The acreage that was injured was only a small portion of the total acreage treated. However, the problem is still serious enough to cause concern, and anyone using atrazine should take steps to avoid residue problems.

Atrazine is one of our best pre-emergence herbicides from the standpoint of corn tolerance and weed control. Since it can persist in the soil for several months, it controls weeds during most of the growing season. Unfortunately, it does not have a "built-in switch" so that it can be "shut off" at the end of the season. Breakdown of the chemical is a gradual process, and some of it may carry over into the following year. If there is sufficient carry-over, crops other than corn grown the following year may be injured. Oats are the most sensitive crop commonly grown in Illinois, but soybeans can also suffer injury.

Carry-over problems are less serious on the soils of southern Illinois than on the darker soils farther north, which require higher rates of atrazine to control weeds, and on which farmers grow more oats.

Although atrazine tends to break down slowly, the rate of breakdown will be influenced by environmental factors that vary from year to year. At present it is difficult to predict whether crops other than corn that follow atrazine-treated

corn will be injured, but there are several precautions that can be taken to help prevent residue problems with atrazine:

1. Apply the right rate accurately. Do not overdose, overlap, or slow down during application.
2. Use the wettable powder form of atrazine rather than granules. Although residue problems are possible with the wettable powder, most of the problems in 1962 occurred where granules had been used. The more uniform distribution that has been possible with sprays is especially important with atrazine. If you do use granules, choose the 10% material instead of the 20% to get a better spread over the soil.
3. Keep the wettable powder well agitated in spray tanks.
4. Use band rather than broadcast applications.
5. Be sure that applicators are shut off and no chemical is flowing when turning on field ends. With some equipment, granules continue to flow from the flexible tubes below the shut-off when the machine is turning on field ends. Then end rows end up with excessive rates.
6. Be sure your equipment is operating properly. Although some equipment may meter out granules accurately at the hopper, this does not guarantee accurate application at the soil surface. Shorten long, flexible tubes if they sag. Low-mounted applicators present fewer problems and will probably become more popular with both manufacturers and farmers.
7. Plan ahead. Wherever atrazine is used, plant corn the following year, and use no additional atrazine before planting crops other than corn.
8. Use tillage to help distribute any possible residue more evenly. Plowing, disking cornstalks in the fall, several good diskings, diagonal disking, and other tillage operations may help to distribute atrazine.

Like most other things on your farm, herbicides are good when used carefully. You can get good results from using atrazine to control weeds, and checking these pointers will help to prevent carry-over danger.

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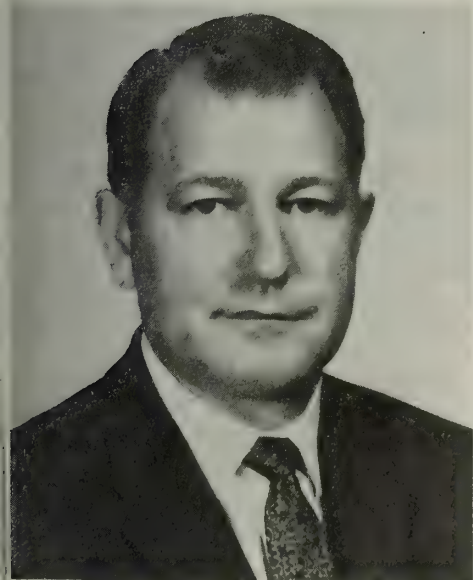
UNIVERSITY OF ILLINOIS

URBANA

April 18, 1963

No. 236

M. D. THORNE BECOMES NEW HEAD OF AGRONOMY DEPARTMENT



Dr. Marlowe D. Thorne has now joined us as head of the Department of Agronomy at the University of Illinois. He comes to us from Oklahoma State University, where he also headed the agronomy department. Surely Oklahoma's loss is Illinois' gain. In his new position Dr. Thorne will participate actively in the extension program of the department and of the College of Agriculture. He succeeds M. B. Russell, who became Associate Director of the Illinois Agricultural Experiment Station last September.

Here is a short history of Dr. Thorne and his accomplishments. He was born in Brigham City, Utah, on November 4, 1918. After attending Weber College in Ogden, Utah, he went on to receive the B. S. degree from Utah State University in 1940. He then earned the M. S. degree at Iowa State University in 1942 and the Ph. D. degree from Cornell University, Ithaca, New York, in 1948.

He served in the United States Army Air Force from 1943 to 1945. He joined the Pineapple Research Institute in Hawaii, where he did double duty as soil physicist and head of their Department of Agronomy from 1947 to 1954. Then he moved back to the mainland, serving as a soil scientist and Irrigation Work Project Leader, United States Department of Agriculture Soil and Water Conservation Research Branch, 1955-1956. He was Professor of Agronomy and Head of the Department of Agronomy at Oklahoma State University from 1956 until he came to Illinois.

Dr. Thorne was selected for "Who's Who" in America in 1962. He is Associate Editor for Soils of the Agronomy Journal, published by the American Society of Agronomy. He also serves as a member of the editorial board of the Society's Crops and Soils Magazine.

He is a member of the American Society of Agronomy, Soil Science Society of America, International Society of Soil Science, Sigma Xi, Alpha Zeta, Gamma Sigma Delta, Lions Club, and Church of Jesus Christ of Latter Day Saints.

Dr. and Mrs. Thorne have four children, Terry 20, Judy 17, Melvin 12, and Elaine 9. We are looking forward to having his family with us.

Dr. Thorne brings to Illinois a wealth of experience, both in agronomy and in administration. We in agronomy extension are looking forward to working with him toward our common goal, a prosperous, forward-looking Illinois agriculture.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

April 25, 1963

No. 237

WHY FOXTAIL?

Why do we have so much giant foxtail? This pest has become one of our most serious weeds in Illinois. An annual grass, giant foxtail came to us from China, probably in the early 1930s. It found a real home on our fertile plains and has spread rapidly in recent years.

One reason for the increase in giant foxtail has been the reduction of broad-leaved weed competition through the use of 2,4-D. Changes in planting practices have also helped it along. Now more than 90 percent of Illinois farmers hill-drop or drill their corn. Very few check their rows. Since hill-dropping or drilling rules out cross cultivation, foxtail has more chance to grow in the row with the crop.

Why control giant foxtail? Research clearly indicates that yields can easily be reduced by 25 percent where foxtail growing in the crop row competes with corn and soybeans for nutrients, light, and moisture. Foxtail is also a nuisance at harvest time, when it interferes with corn combining and picking. And it's difficult to clean the seed from clover and timothy seed crops. Why control foxtail? Because this weed costs you money!

Why have giant foxtail? Early rotary hoeing and good row cultivation can help control foxtail. And, fortunately, new pre-emergence herbicides applied at planting time can also control this weed.

Because foxtail is an annual, plants from the previous year will not grow again. New plants will grow only from seed. Pre-emergence herbicides attack the young seedlings right after the seeds germinate.

Since the weeds between the row can be easily controlled with cultivation, it is usually most economical to apply the pre-emergence herbicides just over the rows in 14-inch bands. That's the area that is difficult to reach with the cultivator.

In fields where giant foxtail is primarily at the ends, there is no need to treat the whole field with pre-emergence chemicals. Apply them just at the ends or in other areas where you expect the weed to be bad.

In fence rows, dalapon applied before foxtail heads out can be a big help. A rate of 3 or 4 pounds of dalapon per acre should do the job in fence rows if the foxtail isn't too large. Two miles of fence row four feet wide is about an acre. One or two pounds of 2,4-D can be added at the same time to give broad-leaved weed control.

Since foxtail is a prolific seed producer and some seeds may remain viable in the soil for 20 or 30 years, it is not likely that we will eliminate giant foxtail in Illinois. But cultivation and herbicides can control this pest and keep it from competing with crops. So why let foxtail cut your profits?

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CROPS AND SOILS

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April 29, 1963

No. 238

NEW VARIETIES OF SOYBEANS FOR 1964

Soybean breeders have taken another big step forward in combating the diseases that can cut your profits. As a result, corn-belt experiment stations have now released three new soybean varieties: Harosoy 63, Hawkeye 63, and Clark 63. All are improved versions of their namesakes.

Each of these new varieties contains resistance to the dangerous soybean disease phytophthora rot. This disease can cause serious losses, particularly during warm, damp weather or in wet areas of a field. The disease caused by the phytophthora fungus persists in the soil, infecting the roots and stems of the plant. Infected areas then rot, reducing the plant's ability to take up water and nutrients. Plants that are hit hard often die; others may recover but produce few beans.

Phytophthora rot striking in Ohio and Indiana has caused serious losses. And we have seen this disease more and more frequently in Illinois soybean fields. Some fields have been severely reduced. All of the varieties presently grown in the state are susceptible.

A few years ago plant breeders discovered resistance to phytophthora rot in Blackhawk, a very early variety now rarely grown in Illinois. They added this resistance to Harosoy, Hawkeye, and Clark through a backcross program.

To illustrate how this method works, let's look at Harosoy 63: First, the plant breeders crossed Harosoy with Blackhawk. Then they backcrossed the progeny to Harosoy. From this generation they then selected plants that contained resistance to phytophthora root rot. They backcrossed these plants to Harosoy and made further selections. After seven generations of such backcrossing and selecting, they obtained a variety that looks and behaves like Harosoy in every way except when phytophthora rot attacks. Then Harosoy 63 continues to grow normally while Harosoy suffers damage.

Hawkeye 63 and Clark 63 were developed in similar fashion. Each performs just like its namesake until phytophthora arrives. Then the new varieties come into their own, producing a normal crop.

This difference is due to an important physiological reaction. When the phytophthora organism attacks a normal Harosoy plant, it encounters little resistance. But when phytophthora attacks Harosoy 63, the plant produces a chemical that limits the growth of the fungus, keeping it from doing harm. The ability to produce this phytophthora-inhibiting chemical is carried by all three new varieties. It is not carried by their parental namesakes.

These new varieties will provide corn-belt farmers with needed insurance against phytophthora rot attack. They represent a major breakthrough in soybean disease control.

Clark 63 contains a bonus. Plant breeders have also added pustule resistance to this variety. Bacterial pustule is a leaf spot disease that infects soybeans

throughout central and southern Illinois. Pustule resistance, discovered in a breeding line called CNS, was added by a backcross program similar to that outlined above.

Seed supplies of these new phytophthora-resistant varieties will be available to farmers in 1964. This year, in 1963, certified seed growers are increasing stocks. Seed stocks are still too limited for use for any purpose other than seed increase. But by 1964 substantial quantities of certified seed will be available to all Illinois farmers.

Here's a word of caution for those who are looking ahead: Insist on certified seed when buying these new varieties next year. There's no way to tell Harosoy 63 seed from that of Harosoy. Nor can the other varieties be told from their parent until phytophthora strikes. If you want the advantage of phytophthora rot resistance, be sure that you're getting the variety with the 63 number and that the seed is certified. Certified seed is your best guarantee that you are getting what you pay for.

For complete information on soybean varieties in Illinois, write to the Agronomy Department, University of Illinois, Urbana, Illinois, and request "Soybean Varieties for 1963," publication number AG-1895 by W. D. Pardee and W. O. Scott.

Note: For your convenience, we supply your Agronomy News issues punched so that you can put them into a loose-leaf notebook. We hope that you will keep these issues. Those who do tell us that this file gives them a ready year-round reference on agronomy topics. We hope you will find this true too.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 6, 1963

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No. 239

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Cooperative Extension Service, College of Agriculture, University of Illinois
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AGRONOMY

CROPS AND SOILS

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May 3, 1963

No. 240

PRE-EMERGENCE HERBICIDES FOR CORN

If cultivation isn't controlling your weeds, you may find that herbicides can pay off. Use them to supplement cultural practices, particularly where annual grasses are likely to be a problem in crop rows. Best pre-emergence herbicides for corn are atrazine, Randox, Randox-T, and 2,4-D ester.

Atrazine is an excellent herbicide for pre-emergence weed control in corn. It is less soluble than most other pre-emergence herbicides and so requires a little more rainfall to make it effective. Because atrazine remains in the soil longer, it can often control weeds for almost an entire season. Corn can tolerate high rates of atrazine without danger, but some crops may suffer damage from atrazine that carries over in the soil. Oats are particularly sensitive to this chemical. Injury to soybeans has also been evident.

There are several ways to avoid problems from atrazine residue. First, apply it as a spray rather than as granules. Put it on in bands over the row rather than as broadcast applications. Do not use atrazine on corn the year before you plan to plant another crop, such as oats. Most important, don't exceed the recommended rate for the type of soil you are treating.

Atrazine controls weeds more consistently on the light-colored soils of southern Illinois than on the dark, high-organic-matter soils in the central and northern parts of the state. Lower rates of atrazine do the job on these lighter soils and few southern Illinois farmers grow oats, so they have had little or no problem with atrazine carry-over. Most cases of damage have occurred on the darker soils farther north.

Randox is effective on annual grass weeds. Corn has good tolerance to it. Randox must be handled carefully to avoid irritating the skin and eyes. The granular form helps to reduce irritation, but does not eliminate it. Randox has generally performed more consistently on the darker, high-organic-matter soils of northern Illinois than on the lighter soils of southern Illinois.

Randox-T controls broad-leaved weeds as well as grasses, but corn has less tolerance to Randox-T than to Randox. In a few isolated cases injury has occurred to soybeans grown the year after corn was treated with Randox-T. This chemical is irritating to the user and should be handled carefully. Randox-T does best on soils that are relatively high in clay and organic matter.

2,4-D ester is the lowest cost pre-emergence material for corn. However, control is less consistent than with the others, and it sometimes damages the crop. The ester form of 2,4-D is best for pre-emergence application, since the amine form is more soluble and likely to leach into the soil. Do not apply 2,4-D as pre-emergence on sandy soil.

Eptam is recommended for pre-emergence use in areas where Johnsongrass is a serious problem. Dalapon can be used to help control old stands of Johnsongrass prior to planting. Then use Eptam at planting time to control Johnsongrass seedlings.

For further information and current recommendations on weed control, get a copy of Circular 856, "Weed Control in Field Crops," from your county extension adviser or from the Information Office, College of Agriculture, University of Illinois, Urbana, Illinois.

Rates for Band Application of Pre-emergence Herbicides for Corn

Crop	Herbicide	Amount of commercial product to apply per acre in 12- to 14-inch band	
		Liquid ^{a/}	Granular ^{b/}
Corn	Radox	1 1/3 qt.	7 lb. (20%)
	Atrazine	5/6 to 1 1/4 lb.	6 2/3 to 10 lb. (10%)
	Radox-T	1 1/2 qt.	10 lbs. (35%)
	2,4-D ester	1/2 lb. ^{c/}	3 1/3 lb. (20%)
	Eptam	2/3 qt.	20 lb. (5%)

a/ For band spraying, use the indicated amount of herbicide in 7 to 10 gallons of water per acre.

b/ The amount listed is for material with the indicated percent of active ingredient.

c/ Actual amount of active ingredient (2,4-D acid equivalent).

Cooperative Extension Service, College of Agriculture, University of Illinois
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AGRONOMY

CROPS AND SOILS

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May 10, 1963

PRE-EMERGENCE HERBICIDES FOR SOYBEANS

No. 241

If weeds are cutting your soybean yields, pre-emergence herbicides may bring you profit. They can help out on those grasses and other weeds that the rotary hoe and cultivators just don't seem to get. Chemical weed-killers help most by killing the early-starting weeds. This lets soybeans get off to a running start, giving them the jump on later weeds.

Although pre-emergence herbicides don't always work, they are effective about three out of four years. They do best when there is sufficient rainfall. One feature is the insurance they offer in case wet weather delays cultivation.

For best results, apply the herbicides when planting, or within two or three days after. You can mount attachments right on the planter to apply sprays or granules directly behind the planter wheels.

Amiben, Randox, Alanap, and Sodium PCP are available for pre-emergence use on soybeans.

Amiben, which received label clearance in 1961, has controlled both annual grasses and broad-leaved weeds in soybeans better than most other herbicides. Soybeans appear to have relatively good tolerance to it, although early stunting sometimes occurs.

Randox controls annual grasses, but not most broad-leaved weeds. Use Randox only on soils that are relatively high in clay and organic matter, since it goes rapidly into solution and may leach out of lighter soils. Soybeans have good tolerance to Randox. Handle this chemical carefully to avoid irritation. Don't use its sister chemical, Randox-T, on soybeans, since the "T" part kills beans.

Alanap is effective on annual grasses and most broad-leaved weeds except smartweed. You can use a mixture of Alanap and CIPC to control smartweed. Alanap can cut soybean emergence if heavy rains move the chemical down around the seed. Do not use Alanap on sandy soils, where such damage is more likely to occur.

Sodium PCP (sodium pentachlorophenate), which received label clearance for pre-emergence use on soybeans in 1961, controls broad-leaved weeds better than grasses. Soybeans do not have exceptionally good tolerance to it and are sometimes injured. Be sure to use sodium pentachlorophenate, and not pentachlorophenol. Handle PCP carefully, since either the dust or fine spray particles can cause sneezing and irritate the skin. Sodium PCP does better on the low-organic-matter soils of southern Illinois than on the soils of northern Illinois with more organic matter.

For further information and current recommendations on weed control, get a copy of Circular 856, "Weed Control in Field Crops," from your county extension adviser or from the Information Office, College of Agriculture, University of Illinois, Urbana, Illinois.

Band Application of Pre-emergence Herbicides for Soybeans

Crop	Herbicide	Amount of commercial product to apply per acre in 12- to 14-inch band	
		Liquid ^a /	Granular ^b /
Soybeans	Randox	1 1/3 qt.	7 lb. (20%)
	Amiben	2 qt.	10 lb. (10%)
	Alanap	2/3 gal.	14 lb. (10%)
	Sodium PCP	7 to 10 lbs.	7 to 10 lbs. (90%)

- a/ For band spraying, use the indicated amount of herbicide in 7 to 10 gallons of water per acre.
- b/ The amount listed is for material with the indicated percent of active ingredient.

Cooperative Extension Service, College of Agriculture, University of Illinois
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AGRONOMY

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May 17, 1963

No. 242

SIDE-DRESSING CORN WITH NITROGEN

Each year more and more Illinois farmers side-dress their corn with nitrogen. Side-dressing is not necessarily better than plowing under or broadcasting before planting. Each way has its advantages. Personal preference, available equipment, convenience, and cost may be the determining factors.

Consider side-dressing your corn if you did not apply enough nitrogen earlier or if you had unusually heavy rains after planting. Leaching of nitrogen often occurs on sandy soils. Extra-wet conditions can cause denitrification loss on poorly drained soils.

Side-dressing has some special advantages: (1) you can apply nitrogen in years when you most need it and omit it in other years. If, for example, you have a very poor stand of corn or large areas drowned out, you can save the nitrogen you planned to side-dress. But, if you have an unusually good stand and plenty of moisture in the subsoil to produce top yields, you can side-dress at an extra-heavy rate. (2) Side-dressing gets the nitrogen on after you've controlled the weeds, so you fertilize corn, not weeds. (3) There's less time for nitrogen to leach from sandy soils or to break down--by denitrification--in poorly drained soils.

You can side-dress dry, liquid, or gaseous nitrogen carriers. Cost, available equipment, and convenience should dictate which form to use. Compare costs of nitrogen fertilizers on the basis of cost per pound of actual nitrogen applied to the soil. If applied correctly, the different forms of nitrogen are nearly equally effective.

What about side-dressing phosphorus and potassium with the nitrogen? This generally won't pay. You'll get these nutrients on too late and in the wrong place for efficient use. Corn needs phosphorus and potassium early, in its first few weeks. And these elements stay where you place them in the soil. So they'll be near the surface for efficient use in midsummer.

Nitrogen placement, how deep and where? Get side-dressed nitrogen down into the soil. Nitrogen side-dressed on the soil surface won't be effective until rain carries it down into the root zone. Corn roots can't operate in dry surface soil. Side-dress dry and liquid forms preferably 1 to 2 inches deep. Some nitrogen carriers must be discharged under the soil surface to prevent volatilization losses. So place anhydrous ammonia four to six inches deep. Put solutions that contain free ammonia at least one inch deep.

To avoid root damage, side-dress in the middle of the corn row. You'll gain nothing by side-dressing close to the row, since corn roots meet across the row when corn is knee-high.

When should you side-dress? You can side-dress nitrogen any time from corn planting until the plants are too tall to get equipment through. However, delay increases root damage. Besides, a prolonged rainy period would prevent timely application. So, for best results, side-dress before the plants reach "knee-high."

How much nitrogen should you apply? This depends upon how much you estimate it will pay you to use and how much you applied before or at planting time. Here are suggested total amounts of nitrogen to apply. To determine the amount to side-dress, subtract the amount that you have already applied.

Situation 1. Following a good legume sod or 10 tons of manure. Consider a rate from 0 to 70 pounds of nitrogen per acre. Dark prairie soils with a good legume sod or 10 tons of manure can usually supply enough nitrogen for 90 to 100 bushels of corn. If you aim for 125 bushels, you'll need 50 to 70 pounds of nitrogen per acre besides the legume or manure. On light-colored timber soils, apply about 70 pounds per acre.

Situation 2. Following soybeans, a small grain--no catch crop--or one year of corn where you use a legume hay or catch crop once in five or six years. Use 70 to 100 pounds of nitrogen on dark prairie soils and 100 to 120 pounds on light-colored timber soils. Apply the lower rates on soils that average 70 to 80 bushels of corn per acre with good management. Apply the higher rates on soils that average 90 to 105 bushels per acre. These soils will produce 140 to 160 bushels in the best years with economical fertilizer rates.

Situation 3. Continuous corn or corn-soybean grain farming system. For best results, corn requires 100 to 150 pounds of nitrogen per acre in such a system. The lower rate is for very dark, imperfectly drained soils, and the upper rate is for deep, well drained prairie soils.

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May 20, 1963

No. 243

SUDAN-SORGHUM HYBRIDS AND SUMMER FORAGE

New hybrids--crosses between sudangrass and forage sorghums--may help your summer feeding program.

These hybrids are taller and thicker stemmed than sudangrass and can be higher yielding. This year two new varieties, Sudax and Hidan 37, are available. Both have performed well in University of Illinois Agronomy Department trials.

Agronomist Carl Hittle compared similar hybrids with Piper sudangrass at Urbana from 1958 to 1960, taking three cuttings each year. Both the hybrids and the sudangrass averaged about 4.3 tons of dry matter per acre for the three years.

Last year agronomists compared the sudan-sorghum hybrids with sudangrass in two trials at Urbana, taking off four cuttings to imitate pasture effects. In one test the hybrids outyielded Piper; in the other trial Piper came out ahead. In a similar test at Carbondale, conducted in cooperation with Southern Illinois University, the hybrids outyielded Piper. Average yields in all tests were high. Some varieties produced 9 tons of dry matter per acre at Urbana last year!

Further 1962 trials at both Urbana and Carbondale tested these same varieties under a two-cutting management designed for hay or silage production. Although the two types performed similarly, the yield difference, if any, generally favored the hybrids. This difference increased when the first harvest was delayed, as might happen under a one- or two-cutting hay or silage operation. Then the hybrid types seemed to yield more in the first cutting than the sudangrass. Under pasture management, with rotational grazing or three or four cuttings a year, yields of the two types were about equal.

Trials have shown little difference in feeding quality between sudangrass and sudan-sorghum hybrids. New York trials showed that they were the same both in palatability and in digestibility of dry matter when cut at the same stage of maturity.

Dhurrin, which animals convert to poisonous prussic acid, is present to some degree in all sudangrass and sorghum varieties. It can be dangerously high in young regrowth under 18 inches high. So, if you feed this forage, wait until it reaches this height before harvesting any of these crops. Piper sudangrass has the lowest dhurrin content of the group. It presents little danger to animals at any growth stage, but to play safe wait for the 18-inch height. Sudan-sorghum hybrids have a somewhat higher dhurrin content than Piper. But again your animals will be safe if you keep them off during critical periods when new growth is less than 18 inches tall.

All of these grasses seem best suited to summer pasture or green-chop programs where you can harvest them several times at an immature stage. Corn and sorghum make considerably better silage crops for winter feed because of their additional grain. Recent feeding trials at the U. of I. Dixon Springs Experiment Station show that animals fed corn silage gained considerably better than animals fed on sudan-sorghum silage.

Both sudangrass and the sudan-sorghum hybrids, when planted in May or June, can give you large quantities of feed for summer grazing when other pastures are drying up. Or, if you are chopping green feed and bringing it to your animals, these hybrids can give you high tonnage in July, August, and September.

Agronomists suggest that you plant and manage these sudan-sorghum hybrids in the same way as you would manage sudangrass. For top production, sow about 25 pounds of seed per acre and fertilize as for corn.

But be careful. Don't confuse these hybrids with the grass commonly called sorghum alnum or sorghum grass. This is a hybrid between sudangrass and Johnson-grass. It is low in yield and high in dhurrian and may start a weed problem by crossing with Johnsongrass.

Many livestockmen need a crop that provides feed during the pasture-short months of August and September. Both sudangrass and the sudan-sorghum hybrids can provide high yields during this season. If you are short on summer pasture, these grasses may help you.

* * * * *

Note: Don't forget Agronomy Day at Urbana, June 20. We hope you can come to see us then.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY

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May 24, 1963

No. 244

TIPS ON CLOVER AND GRASS SEED PRODUCTION

Many Illinois farmers use their clover or grass for seed to add an extra cash crop to their rotation. If you manage these crops properly, you can show a profit. Illinois-grown seed finds ready markets both within and outside the state.

But seed production in Illinois is no "cinch." The worst hazard is bad weather. Rain at flowering time discourages pollinating bees and so can lower clover seed set. And later on, raindrops can spatter ripe seeds onto the ground and soak those that remain in the head, leaving them easy prey for mildews and molds. So you must harvest your crop as soon as it's ready. A few days' delay can cost you your profit...or your crop.

To make the most from your seed crop, you must make certain decisions early in the year. Few Illinois farmers grow clovers or grasses for seed alone. Most of them plan to graze or cut hay for additional income. So you'll want to decide early which cutting to take for seed.

For instance, the grasses--particularly timothy, redtop, and fescue--produce seed from the first growth. So don't graze or cut these grasses until after you harvest the seed. Research shows that even light spring grazing can lower seed yields.

The same holds true for mammoth and alsike clovers. These produce only one hay crop a year. So you cannot harvest seed and hay in the same year. Spring grazing also will reduce seed yields.

Sweet clover seed normally yields most when you allow the first crop to mature and set seed undisturbed. But you may prefer to sacrifice some seed by lightly grazing or clipping sweet clover early in the season to reduce its height. Otherwise the crop can grow so tall and rank that it's hard to harvest for seed.

You can leave Korean lespedeza undisturbed, or you can clip or graze it in July, leaving the regrowth for seed production. But if you clip, clip high. If you graze, graze lightly or you'll lower seed yields.

Red clover produces seed whenever the plants are left long enough to mature. Normally, the second growth produces the most seed. The time you harvest your first hay crop strongly influences the amount of seed this second crop produces. For best seed yields, take off the first growth by at least the full-bloom stage but before any heads have turned brown. Very early cutting is bad too. Experiments in Ohio and Michigan showed that the second crop produced the most seed when the first growth was cut for hay sometime between 30 percent and full bloom.

Check early on weeds and other crops in your seed field. Many of them produce seed that can contaminate your seed, cutting its value or even making it unsalable. Giant foxtail contamination now presents a serious problem in red clover seed production. It's difficult to clean the seed of this pest from clover seed. The Illinois state seed law sets strict limits on the amount of giant foxtail that can legally appear in red clover seed.

Modern herbicides can control many of the weeds commonly found in grass seed fields. By applying chemicals early, you can control thistle, dock, wild onion, garlic, and many other weeds that might contaminate your seed. You may need to cut or remove by hand grassy weeds or even other pasture grasses that may contaminate seed. If weed patches are too large, cut around them at harvest. Be particularly wary of weeds or grasses that produce seeds the same size and weight as those of your crop. These seeds are "tough" to clean out. If giant foxtail or other weeds are scattered heavily throughout the field, you may be wise to use the crop for hay or pasture rather than for seed.

You'll need fertility to grow seed. Clovers need a well-limed soil along with adequate phosphorus and potassium. Grasses need nitrogen. You can often double your grass seed yields by putting on 40 to 60 pounds of nitrogen per acre in the fall or very early spring.

And when you harvest your seed, have it cleaned by an experienced seedsman with modern equipment. Seed-cleaning equipment has improved just as much as farm machinery in the last decade, so the home fanning mill is out of date. The modern seedsman can do wonders in taking out weed seeds and other crop seeds, as well as chaff and dirt.

Grass and clover seed crops may fit into your farm operation. But in producing seed, even more than with other crops, you must pay attention to details in order to show a profit.

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CROPS AND SOILS

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May 27, 1963

No. 245

NEW IDEAS ON MINIMUM TILLAGE

Three-Trip, Spray, Plant, and Pick

Most farmers would agree that an average corn yield of 110 bushels an acre isn't good, particularly on a sandy soil. So Illinois agronomists Tom Hinesly and Ellery Knake were pleased with last year's harvest on Illinois experimental plots, particularly since they grew the corn without plowing, harrowing, or cultivating. And check plots grown with normal tillage and cultivation averaged only 96 bushels an acre!

Results of recent studies in New York, Virginia, and Ohio suggest that present concepts of minimum tillage are fine, but that we may be able to go much further. Hinesly and Knake agree. They conducted their tests on the Storm Brothers farm in Iroquois county. The field, a sandy loam soil, had grown soybeans the previous year. Field brome, planted right after soybean harvest, established itself quickly and formed a solid grass cover over the field.

Hinesly and Knake made only three trips over the field in growing their corn crop. In their first trip they sprayed with grass-killing herbicides. They waited two weeks and then started planting corn. A rotary tiller worked a band of soil about 10 inches wide and 5 inches deep ahead of each planter opener. The soil between the rows remained undisturbed. The next machine used on the field was the corn-dicker.

The agronomists tried several rates of three different herbicides: dalapon, prox, and amitrole-T. All three chemicals killed the field brome. When put on at recommended rates, all three also controlled weeds. Since they were applied two weeks before planting, they had no apparent effect on the corn population.

Hinesly and Knake also tried different nitrogen levels, ranging from none to 400 pounds an acre. Corn responded well to rates up to about 100 pounds an acre but gained little with higher rates. They applied phosphorus and potash to meet crop needs.

Field brome made an excellent winter cover in this test. A winter annual, field brome is distantly related to smooth brome grass. Planted right after soybean harvest, it developed an extensive root system that held the soil against winter erosion. Then in the spring it grew slowly, unlike rye, which often gets too tall too soon. When sprayed with herbicides, the field brome curled and died. Very few plants remained, and they presented no problem in planting.

Why did these plots outyield those receiving normal tillage and cultivation? Hinesly and Knake feel that several things worked in their favor. The herbicides had killed weeds coming through the surface. With no further cultivation, no more weed seeds were brought to the surface. The result--no weed problem. They also feel that they saved moisture by not plowing and harrowing. These practices speed soil drying. When moisture is lost in this way, it may not be replaced later in the season. And tilling the 10-inch-wide strip provided a good seedbed for the corn. On the other hand, weeds between the row had to grow in a poor seedbed treated with herbicides.

Agronomists are always wary of one-year results. Hinesly and Knake will be testing chemical tillage again this year. They will also try it at several other locations in the state.

This practice may be most helpful to farmers on sandy soils who wish to rotate corn and soybeans. By using field brome for winter cover and a three-trip system--to spray, plant, and pick their corn--they could intensify their rotation and cut their costs. Perhaps many Illinois farmers can leave the plow, harrow, and cultivator in the shed without hurting either their yields or their soils.

* * * * *

Note: We're holding our 1963 Agronomy Day at Urbana on June 20. Hinesly and Knake will show you this year's plots testing their new way of growing corn. Come to see us on June 20.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

This material is for your information.

W. D. Pardee
Extension Agronomist

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United States Department of Agriculture
University of Illinois
Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

May 31, 1963

No. 246

1963 AGRONOMY DAY SET FOR JUNE 20

Ask an Illinois agronomist "what's new?" and he'll hesitate before answering. And he has good reason to hesitate because there are so many things that are new in agronomy, the science of growing crops and managing soils. This summer Illinois agronomists are pooling their efforts to show you what's new. They have set June 20 as the date for the annual Agronomy Day at the University South Farm at Urbana. They will devote the day to bringing you up to date on the latest in research results. And they will also have some clues about what the future may bring in Illinois crop production.

If you grow crops, you are sure to find something of value here. Among the features will be:

1. New post-emergence herbicides and how they work. Dr. Fred Slife will show you his studies with these chemicals.
2. Growing corn without plowing, harrowing, or cultivating. Unbelievable? Well, Drs. Tom Hinesly and Ellery Knake did last year and they increased yields by 14 bushels an acre. They will show you how their corn looks this year.
3. Wheat varieties. Several outstanding new wheat varieties will be available this fall. See them growing side by side with your present varieties.
4. New soybean varieties. Three new soybean varieties with improved disease resistance will be available next year. Agronomists expect them to rapidly replace present varieties. If you grow soybeans, you won't want to miss this stop.
5. Wheat, oat, and corn diseases. Why were oats yellow this spring? What's new in the battle against wheat disease? And how about corn viruses; are these hurting your yields?
6. Weed competition studies. Just how harmful are a few giant foxtail plants. Agronomists suspect that they are worse than we think.
7. Corn and its relatives. You'll see teosinte, tripsacum, and other members of the corn family that may serve as sources of traits to improve corn.
8. Blight-resistant corn hybrids. You will see a major break-through by Dr. Art Hooker, who has developed corn lines that successfully resist northern leaf blight, a disease that has cost Illinois farmers millions of dollars. This new type of resistance promises in a few years to make northern corn leaf blight something you'll only remember. Dr. Hooker and his associates will explain how this new resistance works and what it can mean to you.
9. New oat varieties. Yes, there are newcomers here too. Newton has been tops in central Illinois for several years, but you'll want to look at the new Garland variety. It may be a "comer."
10. All-out wheat yields. Agronomist Johnny Pendleton says, "If European farmers and Washington State farmers can get 100 bushels of wheat an acre, why can't we?" He's out to find out just what factors are limiting our wheat yields. Last year he got 88 bushels an acre from one treatment. This year he thinks he may do better. You may agree with him when you see how his wheat looks.

11. Insect report. Dr. Pete Petty will bring you up to date on the 1963 insect situation. He'll tell you which insects are serious this year and how to control them.
12. Alfalfa varieties. A wave of new alfalfa varieties is on the way. Many are first-rate, outyielding older varieties by a ton or more of hay per acre. Others won't make the grade. You'll see them growing side by side.
13. All-out corn yields. Larry Miller is trying to break through the ceiling on his corn yields. Last year he beat 180 bushels with one treatment. He'll tell you how he did it and what he's planning next.
14. Lawn management. Jack Butler, University of Illinois lawn specialist, will bring you the latest on mowing to give you a lawn you can brag about.
15. How corn grows. When it rains can be more important than how much. The same is true of wind, hail, hot and cold weather, and even fertilization. What happens in the corn plant as it develops that makes timing important? Frankly, we don't know all that goes on--but Gene Siemer has set up a first-rate demonstration to show some things that we do know.

There's the program. Illinois agronomists hope you'll come on June 20. You'll probably have company. We're expecting at least 2,000 farmers to visit us. Chances are that you'll rub elbows with some old friends and make some new ones.

So mark the date, June 20, on your calendar now. Tours will be starting from 9 a.m. through 11 a.m. and will last for about three hours. There'll be time out for lunch, and refreshments will be available for all. We think you'll find Agronomy Day a day well spent. We hope we'll see you there!

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

June 3, 1963

No. 247

AGRONOMY FIELD DAYS COMING

Each year several thousand Illinois farmers turn out to attend field days held at the agronomy research fields over the state. This year Illinois agronomists have once again teamed up with the county extension farm advisers to plan a top-notch series of meetings. And you are invited. Check the locations below for the one nearest to you.

Tuesday, June 11. Brownstown Research Center Open House (Fayette County). Note this date, it's coming right up. "Pat" Johnson, area agronomist, has planned an outstanding tour on the U. of I. Brownstown field. Other agronomists will help out. You will see new wheat varieties like Reed and Knox 62, as well as some unusual ideas in land preparation, soil insecticide comparisons, how new "slow-release" nitrogen carriers work on wheat, soybeans growing without cultivation, and even how to get profit from the "weed" trees in your wood lot. The meeting starts at 9:30 a.m., and there will be tours leaving continually throughout the morning and into the afternoon. Lunch will be served.

Wednesday, June 12. Carlinville Field Wheat Day. This year the Carlinville field features more experiments on wheat than any other location in Illinois.

Here you'll also see the new Reed and Knox 62 growing next to your present varieties. If you are a wheat grower, you won't want to miss these new varieties that will be available for fall planting. You will also see comparisons of different planting dates and rates and kinds of nitrogen fertilization as well as superphosphate and mixed fertilizer tests.

You will also see how soil treatments and crop rotations affect wheat and the other crops that you grow. Les Boone, area agronomist, will lead the tour starting at 1:30 p.m. Other agronomy specialists will assist.

Thursday, June 13. Toledo Agronomy Research Field (Cumberland County). At Toledo you will see research to solve your "slick spot" problems and wheat varieties under various fertility practices. You will also see the effects of Leonardite as a soil conditioner and a comparison of soil insecticides on corn. In addition you will see effects of various rotations and fertilizer practices on crop yields. "Pat" Johnson is in charge of the tour. Meeting time is 1:30 p.m.

Friday, June 14. Newton Research Field (Jasper County). Here you'll see the new wheat varieties compared with those you are growing now. You will also see the effects of various nitrogen treatments, as well as research on "slick spots" and soil insecticides. "Pat" Johnson will lead the tour, which will start at 1:30 p.m.

June 20. Agronomy Day (Agronomy South Farm, Urbana). You'll see new crop varieties, herbicides, plant diseases, lawns, zero tillage, new research on corn, soybeans, and alfalfa, and many other topics. This is a day you won't want to miss. Agronomy tours start leaving at 9:00 a.m. and will continue through noon. Lunch and refreshments will be available.

July 1. DeKalb Agronomy Research Center (Shabbona, Illinois). Here northern Illinois farmers will see new oat varieties, disease-resistant soybeans, what's new in fertilizer practices, lawn care, alfalfa varieties, and many other topics. Area agronomist Derrold Mulvaney has a big day planned, and he'll be joined by other agronomists. Starting time is 1:30 p.m.

August 1. Carbondale (in cooperation with Southern Illinois University). You'll see what's new in crop varieties, chemical weed killers, fertility practices, and many other topics. Here you can benefit from the combined knowledge of two universities. Tours start at 1:00 p.m.

Fall meeting schedule: Check the following dates for meetings at these and other agronomy research fields. Mark your calendar now for the one nearest you. We'll give you meeting details in a later issue.

September 4	Brownstown	Fayette
September 5	Toledo	Cumberland
September 6	Oblong	Crawford
September 10	Aledo	Mercer
September 11	Carthage	Hancock
September 12	Clayton	Adams
September 13	Hartsburg	Logan
September 17	Elwood	Will
September 18	Dixon	Lee

Progress moves quickly, and nowhere faster than in the area of crops and soils. New varieties are here; so are new herbicides and fertilizer practices, not only in Illinois, but the world over. The top yields of today will be just average tomorrow. Your Illinois agronomists are striving to keep Illinois farmers competitive with the best in the world. Come visit one of their field days and see what's new. You'll find it time well spent.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

No. 248

May 29, 1963

CULTIVATION AFTER USING PRE-EMERGENCE HERBICIDES

Pre-emergence herbicides have become increasingly popular for early weed control in Illinois. An estimated 20 percent of the corn and soybean acreage was treated this year.

A common question from those using these chemical weed killers at planting time is "How soon should I cultivate?" The best method and time for cultivation will depend on the specific situation. What herbicide was used? Was there enough rainfall for the chemical to work? Is it dry enough to cultivate?

Although recommended pre-emergence herbicides can be quite effective, they can also fail, especially when there is not enough rainfall to move them into the soil. Odds are about 3 to 1 that they will do a satisfactory job.

If the chemical is controlling weeds, there is generally no need to rush cultivation of the treated area. If the herbicide was banded over the row, cultivating too soon and too close to the row may throw new weed seeds into the treated area and decrease the benefits from the chemical.

On the other hand, if for some reason the herbicide is not killing weeds, it is better not to wait too long to bring in cultivation equipment.

If one of the more soluble pre-emergence herbicides, such as Randox or 2,4-D, has been applied at planting time and it has not "taken hold" within two weeks and weeds are showing up, the chances are that the chemical is not going to work. In that case it is usually advisable to move in with a rotary hoe or shovel cultivator to get the early weeds.

If one of the chemicals with more residual, such as atrazine or amiben, has been used, weeds may sometimes begin to grow and then die, as the small weeds eventually take the chemical. But it is risky to wait too long, hoping that such chemicals will "take hold," because they may not. With these longer lasting chemicals you can go ahead and clean up the first crop of weeds with the rotary hoe or row cultivator, if weather permits, and probably still get some benefit from the chemical on later weeds.

In research at Urbana during 1961 and 1962 to determine the effect of the rotary hoe on the action of pre-emergence herbicides, rotary hoeing about two weeks after planting did not appear to have much effect, good or bad, on most of the chemicals that were used.

Will your investment be a total loss if you use the shovel cultivator to get at the first crop of weeds? Not necessarily. A chemical with some residual activity, such as atrazine, may remain to help control later weeds even though it did not

work on the first crop of weeds. It is true that new weed seeds will be thrown on top of the chemical band, but some benefit may still be possible as these weed seeds germinate and the roots of the weeds reach the chemical.

Here are the main points to remember: If it is too wet to cultivate and the chemical is doing a good job of controlling the weeds, be thankful that you used it. If the chemical is not working, weeds are growing, and it is dry enough to cultivate, it's best not to sit around waiting for miracles.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

This material is for your information.

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AGRONOMY

CROPS AND SOILS

NEWS

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URBANA

July 15, 1963

No. 249

RECOGNIZING CROP DEFICIENCY SYMPTOMS

Often your crops can tell you what nutrient they lack--if you can read the symptoms. Here are some tips to help you identify the symptoms and to suggest some remedies you can apply.

CORN

Nitrogen. When corn is short of nitrogen, the lower leaves turn yellow and then die. The yellowing starts at the leaf tip and spreads inward along the vein, leaving a V-shaped yellow area. The lower leaves are affected first, and the damage moves up the plant as the season progresses. Lower leaves gradually wither and die, resulting in "firing."

Symptoms are most apparent during dry weather, when plants have difficulty in picking up nitrogen. When you see these symptoms early, you can side-dress with nitrogen. But when plants are nearly full grown, it's too late to help this year's crop.

Phosphorus deficiency shows up as reddish or purple coloring of the leaves. Unless the shortage is extreme, you'll generally see this symptom only in young plants 6 to 18 inches tall. If you didn't use a soil insecticide, you may see the same results when grape colaspis chew off the roots and reduce the plant's ability to pick up phosphorus. Corn generally outgrows phosphorus deficiency, but its yield will be cut. Because corn needs phosphorus early, side-dressing is not practical. Your best bet is to test the soil and then apply phosphorus in your fertilizer next year.

Potassium deficiency shows first in the bottom leaves and then progresses upwards. This pattern is similar to the one caused by nitrogen shortage. But instead of attacking along the mid-rib, potassium deficiency occurs along the leaf margins, which develop a scorched appearance. Corn will not overcome the deficiency, and its yield will be cut. Once the damage shows up, it's too late to remedy. As with phosphorus, your best bet is to test the soil to find out its needs and then plan to use more potassium in your fertilizer next year.

SOYBEANS

Potassium shortage causes symptoms in soybeans much like those in corn. Damage shows up first on the lower leaves and then moves up the plant. Leaf margins turn yellow before they die. From a distance a soybean field that lacks potassium may look yellow. Close inspection will show that the leaf margins are dead or dying. You won't be able to help this year's crop, but you'll be wise to plan to apply potassium on this field next year.

Manganese deficiency may show up as localized yellow areas in a field. Look closely at individual plants and you'll find that the leaf veins are still green, though the leaves are yellow or white. You're not likely to find this condition unless your soils are alkaline (high in pH). Symptoms are most apparent during a cool, wet June. To correct manganese deficiency, spray the leaves with about 5 pounds of manganese per acre (10 pounds of manganese sulfate) mixed in 20 gallons of water. New leaves formed after application will be green and healthy.

ALFALFA

Potassium deficiency is easy to recognize in its early stages. You'll see small white spots, about pin-head size, around the edge of the leaflet. They are likely to concentrate near the leaf tip. As on other crops, potassium shortage shows up first on the lower alfalfa leaves. New leaves are not discolored. As an affected leaf matures, the whole leaf turns yellow until there's no longer any way to tell what caused the harm.

Symptoms show up most commonly on second and third cuttings in the dry part of the summer. You can top-dress your crop with potassium, but base your top-dressing on soil test rather than on symptoms alone. It's possible that dry weather has temporarily prevented the alfalfa plants from getting to potassium that's in the soil. But you'll be wise to regard potassium deficiency symptoms as warning signs.

Here's a word of caution: Most of the midsummer yellowing you'll see in alfalfa is caused by leaf hopper damage or leaf spot diseases. Leaf hoppers cause a wedge-shaped yellow marking that reaches in from the leaf tips and later spreads to kill the whole leaf. Leaf diseases cause small brown or black spots over the leaves, which gradually turn yellow and die. Since insects and diseases cause far more trouble than nutrient deficiencies in alfalfa, suspect the insects and diseases first.

Boron deficiency symptoms generally show up only in drouth periods. Plants are stunted and show rosetting, a shortening of the internodes between stem branches. You'll also find a yellowing or reddening of the growing tips. Flowers don't form or else they fall off early.

Boron deficiency is often confused with yellowing caused by leaf hoppers, leaf diseases or potassium deficiency. But note that these troubles affect the lower leaves on the whole plant. Boron deficiency hits only the growing tips.

By checking your crops for deficiency symptoms, you can let them tell you what they need. But to find how much, you'll need a soil test. If your crops don't look right and you're still in doubt, check with your county farm adviser. He represents the University of Illinois in your county and will help you find the trouble and suggest a remedy.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

This material is for your information.

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Extension Service
United States Department of Agriculture
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Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

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URBANA

July 24, 1963

JUL 26 1963

No. 250

RENOVATING PERMANENT PASTURE

Five Steps to Pasture Renovation

Do your permanent pastures do the job you want them to do? Are they feeding your cattle, or are they merely serving as exercise lots? Many Illinois farmers are increasing their incomes by putting these acres to work through pasture renovation.

Late summer is a good time for this job, and late summer is almost here. If you have permanent pasture that's not doing its job, consider renovating. Here are some tips that may help you:

1. Soil-test and fertilize. Most permanent pastures are low in fertility. Seventy-five years of grazing have knocked the fertility out of many of them; others are planted on worn-out cropland. A pasture can be no better than the soil it's growing on.

Most important is lime. You can't grow high-producing pastures on highly acid soils. Potassium and phosphorus come next; they feed clover, helping it get off to a good start. Find your needs with a soil test, and then fertilize to meet your needs.

2. Kill the competition. Tear up the seedbed. Unkilled plants can ruin your seeding. Plow if you can; otherwise disk well. Plowing and disking remove the competition and mix in the lime and fertilizer while preparing the seedbed.

In the future, chemicals may help with this job. Researchers are now checking weedkillers that show promise in killing off the old vegetation. But so far the plow and the harrow are your best bet.

3. Plant a good pasture mix.

Legumes. Seed alfalfa where the soil will grow it and where you can switch animals from pasture to pasture to allow the alfalfa time for regrowth. Red clover produces well for one year. Ladino does well in a pasture mixture when moisture is adequate. Lespedeza can help in southern Illinois. Birds-foot trefoil has done well for some northern Illinois farmers, but not so well for others. This crop is well adapted to permanent pasture, but we need more information about it in Illinois.

Grasses. Orchardgrass and fescue compete most with the legume and are harder to manage than other grasses, but they yield more. Fescue does well for winter pasture in southern Illinois. Bluegrass will generally volunteer. It yields less than orchardgrass or fescue, but can contribute feed in spring and fall.

Late summer seedings usually perform best in southern and south-central Illinois. Spring seedings do better in the northern part of the state. After seeding, use a roller to press the soil around the seed. Rolling helps the seed to get the moisture it needs for germination. Corrugated rollers do the best job.

You can plant fall seedings without a companion crop. But use an oat or barley nurse crop with spring seedings. Then plan to graze the nurse crop early to keep it from competing with the grass.

4. Control grazing. In first-year grazing, be careful to let the seeding get well established. Then keep animals off in September and October to allow the plants to get set for winter. Many farmers lose good seedings by overgrazing in the fall of the first year.
5. Clip weeds. Clipping removes competition and lets the desirable grasses and legumes grow. You can use 2,4-D to kill ragweed, dandelion, and buckhorn plantain. But 2,4-D also kills clover, so use it only on grass. Clipping weeds and mature forage growth will help to maintain a high-quality pasture.

Follow-up. Once the pasture is renovated and in high production, proper fertilization and management can keep it that way. Legumes continue to need phosphorus and potassium. Grasses need nitrogen and a little phosphorus and potassium. Rate and frequency of phosphorus and potassium will vary with the soil. Legumes supply nitrogen, but adding 40 to 60 pounds of nitrogen will generally pay where legumes make up less than 30 percent of the stand. And don't overgraze. Animals eat desirable plants to the ground, leaving the weeds. Overgrazing can cost you money by reducing later forage yields.

Pasture renovation has paid off for many Illinois farmers by increasing forage yields and the number of animals their pastures can carry. Check your farm. Perhaps pasture renovation can help you.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

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URBANA

August 1, 1963

No. 251

NOW IS THE TIME TO BUILD AND SEED GRASS WATERWAYS

"It never rains but it pours!" This old saying doesn't always hold true, of course. But each year we get many rains that are heavy enough to cause runoff. And this runoff can be costly. It can "run off" with your topsoil. Good grass waterways can help you control this water and hold your soil. And August is a good month to build and seed grass waterways. Here are some tips that may help you in your planning.

The first steps are to decide where the waterway should be, and then to construct it. Here it's a good idea to talk with your county farm adviser or local S.C.S. technicians. They can give you valuable advice on the best depth and width of waterways for your soil type and slope. They can also help with seeding and fertility recommendations, tell you how much rainfall to allow for, and provide other information useful in establishing a successful waterway.

Fertility

Usually you'll find that the areas where you plan to establish your waterways are low in fertility. In some cases they'll be severely eroded, with only subsoil remaining. After construction, but before the constructed area dries out, apply 8 to 10 tons of straw manure per acre on the waterway and disk it in thoroughly. If you don't have manure available, you'll need plenty of fertilizer. Apply 80 pounds of nitrogen per acre and 80 pounds of P_2O_5 (35 pounds of actual phosphorus) along with 80 pounds of K_2O (66 pounds actual potassium), and disk this in. On washed-out soils you may need both straw manure and a heavy fertilizer application.

Seedbed Preparation

Disk in the manure and plant residues to a depth of 3 or 4 inches. This helps to smooth the channel and mixes the straw and manure with the soil. This top layer then acts as a sponge to absorb rainfall and slow down runoff. Then, before seeding, roll the area, going crosswise to the line of flow. Rolling makes a firm seedbed for grass seed and also conserves moisture. Be careful not to leave tillage marks or wheel tracks up and down the water channel. Water will run along them, washing out your seeding.

Seeding

For best results, don't cover your grass seed more than 1/2 inch deep. And wherever possible use a roller to cover the seed. Don't disc after seeding, since this buries the seed too deeply. You can seed grasses successfully from late July to about September 15 in northern and central Illinois and from August 1 to about September 15 in southern Illinois.

If you seed after mid-September, you should use a small grain to stabilize the soil while the grasses catch hold. Spring oats, at about 1 bushel per acre, will hold the soil and then winterkill, providing little competition for the seeding. Or you can use a thin seeding of rye or wheat to provide erosion control over winter.

Grasses to Seed

Northern and central Illinois farmers can use a mixture of tall fescue or smooth brome on all except very wet soils. Southern Illinois farmers should choose tall fescue. You'll have best luck with a high seeding rate, about 25 to 30 pounds per acre. You can substitute 2 pounds of timothy for 5 pounds of other grasses. Though this seeding rate is far higher than you'd normally use for forage production, remember--grass waterways are problem spots to begin with. A high seeding rate helps insure a stand.

Whether you're in northern or southern Illinois, if your soil is very wet it's wise to mix in some reed canarygrass. Seed 15 pounds of reed canarygrass along with 15 pounds of fescue for the wet spots. However, don't use reed canarygrass where it can spread and become a hazard to drainage ditches downstream.

If your waterway grade is nearly level, your erosion problem is less. So you may choose a mixture of 4 pounds of redtop and 4 pounds of Kentucky bluegrass per acre. Or you may substitute 4 pounds of timothy for either of these. Southern Illinois farmers may use 4 pounds of redtop and 4 pounds of fescue on nearly level grades.

Maintenance

Good grass waterways are worth keeping. Be careful about cutting them up with farm equipment or animal traffic. And don't let them become trash collectors. Keep your grass vigorous with fertilizer. Put on about 60 pounds of nitrogen per acre the first year after seeding. Then apply additional nitrogen in later years as needed to maintain a vigorous stand of grass. It's best to mow grass waterways twice a year. If the first mowing is timed to come after oat harvest, you'll help ground nesting birds survive. Then another mowing in early fall will help control weeds and promote uniform grass growth. Take off mowed material if it's thick enough to cause smothering.

If you have some sloping land, look it over. Can a grass waterway help you save your soil? The time is ripe to build grass waterways!

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Conservation Agronomist
Soil Conservation Service

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AGRONOMY

CROPS AND SOILS

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COLLEGE OF AGRICULTURE

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August 9, 1963

No. 252

SOIL SAMPLING SUGGESTIONS

How much is your time worth per hour?

No matter how high you rate your time, you can probably make "top wages" while taking good soil samples from those fields that you haven't tested recently. The following suggestions can help you get good soil samples:

Lime and fertilizer recommendations based on soil test results are no better than the soil samples you take from the field. When soil finally gets into the test tube in the laboratory, about one teaspoonful represents two to four acres. So be sure it's the right teaspoonful!

When to sample. You'll need soil test results to buy lime and fertilizer wisely. But sample your soil at least one month before you buy, since laboratories need at least 10 days to condition the soil properly for accurate testing.

You may take soil samples at any time of the year--as long as the soil is in workable condition. Agronomists do not recommend soil sampling from frozen ground because it's hard to get representative samples. Plan to test a field every four to six years, or about once during the rotation.

Where to sample. As a farmer, you can do the most accurate sampling. You know the soil's history and fertility pattern. Avoid sampling dead furrows or back furrows, near lime or manure piles, near roads or fences, or in rows where you've band-fertilized. And don't sample any area of a field that differs widely in color, fertility, slope, or texture...and that's too small to treat separately. If the unusual area is large, sample it separately and do not mix its soil with that from the rest of the field.

How to sample. Use a sampling tube, soil auger, spade, or trowel to take soil samples. The sampling tube or auger is easiest to use, particularly where you plan to take a large number of samples. Regardless of what tool you use, take a small portion or core of soil to plow depth at each sampling site. Repeat this procedure at least four more times within a two- to four-acre area to make a composite sample of about one cupful. This amount is enough to send for testing.

Take at least one composite sample to represent every two to four acres of the field. Take 11 samples for a 40-acre field, seven for 20 acres, four for 10 acres, and at least two for fields of less than five acres.

Before taking samples, make an outline map of the field and identify the areas where you plan to take each composite sample. Also identify sample containers to correspond with each composite sample area. Be sure there is no mix-up on identification so that when you get the results of the test you can fit them to the right areas of the field.

Information needed with sample. When you send soil samples to the laboratory, be sure to include information concerning the kind of soil, the lay of the land, drainage, the cropping and fertility history of the past three years, and your intended crop sequence for the next four years. Your farm adviser, local fertilizer dealer, or whoever interprets your soil tests needs this information with your test results so that he can make the best lime and fertilizer recommendations for each field.

Where to have soil tested. About 125 soil testing laboratories in Illinois cooperate with the University of Illinois Agronomy Department. Most counties have at least one cooperating laboratory. These laboratories use methods recommended by the Agronomy Soil Testing Laboratory. You may submit your samples to them with the complete field information. If you do not know the location of approved laboratories in your area, contact your farm adviser. He has detailed instructions for taking soil samples. He can also help you interpret your test results to make your soil testing pay off.

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This material is for your information.

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

September 3, 1963

SUGGESTIONS FOR FERTILIZING WHEAT

Phosphorus and Potassium

Sowing wheat this fall? Here are some tips on fertilization taken from our research results. First, be sure to test your soil. Fertilizer can increase your wheat yields, but you'll make more money if you use the right amount and the right kind. Then follow these three profit-making rules, all well proven in both University trials and farmers' fields:

1. Be sure your wheat has enough soluble phosphorus.
2. Provide enough potassium to meet clover and alfalfa needs.
3. Apply nitrogen as needed to boost wheat yields.

In this issue of Agronomy News we will discuss the role of phosphorus and potassium in fertilizing wheat. Our next issue will cover the place of nitrogen in your wheat fertility program.

Phosphorus. Be sure your wheat has enough soluble phosphorus. Wheat needs phosphorus rapidly, and rock phosphate will not meet its needs. Phosphorus stimulates rapid growth, helps wheat live through the winter, and aids in building a strong, healthy, high-yielding plant. Broadcast phosphorus ahead of planting or drill it with the seed so that it will be "on the job" when needed. If your soil needs large amounts, it's best to broadcast some and then drill the rest. This broadcast portion gives an important boost to the alfalfa and clover underseeding and also helps the wheat.

The P_1 soil test is the best guide in finding how much phosphorus it will pay you to apply. The table below shows the amounts of P_2O_5 to apply at P_1 tests from 10 to 60 for different methods of application.

P_1 soil test	Suggested treatment		
	lb. P_2O_5 per acre		
	Broadcast		Drilled
10-15	90-150	+	30
		or	
	0		80
20	60-120	+	30
		or	
	0		80
30	60-90	or	60
40	0-60	or	30-60
60	0		30

P₂O₅ is actually phosphorus chemically combined with oxygen. Nowadays we are thinking more and more in terms of the actual plant nutrients to apply. The table below gives the same recommendations, but they're expressed in terms of elemental phosphorus instead of P₂O₅.

P ₁ soil test	Suggested treatment lb. phosphorus per acre		
	Broadcast		Drilled
10-15	39-65	+	13
		or	
	0		35
20	26-52	+	13
		or	
	0		35
30	26-39	or	26
40	0-26	or	13-26
60	0		13

Potassium. Be sure to provide enough potassium to meet the needs of the clover and alfalfa if you plan to seed them in the spring. Wheat rarely responds to potassium unless the soil test is below 100. But potassium applied before or at wheat planting time will help establish your forage legume.

When applying both nitrogen and potassium, remember that they are salts. Drilling large amounts with the seed can burn the wheat seedlings. Generally the total amount of nitrogen plus potassium should not exceed 40 pounds per acre. Drilling 15 to 20 pounds of nitrogen leaves a safe margin of only 20 to 25 pounds of potassium. Alfalfa and clover need more than this amount unless soil levels are already adequate. So it's probably better to broadcast 60 to 120 pounds of K₂O--50 to 100 pounds of potassium--for build-up and maintenance.

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SUGGESTIONS FOR FERTILIZING WHEAT

Nitrogen

The last issue of Agronomy News discussed the role of phosphorus and potassium in wheat fertilization. This issue covers nitrogen and its place in your wheat fertility program.

Your nitrogen program can greatly affect both yield and profits from your wheat crop. It can also affect the alfalfa or clover seeded in your wheat.

Wheat responds to extra nitrogen up to the point where lodging occurs. And new stiff-strawed varieties can take more nitrogen before lodging than "older" varieties. Nitrogen boosts yields most on the light-colored soils of southern and south-central Illinois, that is, south of a line from Paris to Alton. Coarse-textured sands and sandy and gravelly loams also need extra nitrogen, since nitrates leach through such soils.

You may apply nitrogen in either the fall or the spring or both. The "right" time depends mostly on your soil. Wheat needs some nitrogen in the fall, but the total uptake by plants and roots usually won't exceed 40 pounds per acre. Most dark Illinois prairie soils can supply this much.

On light-colored soils, drill a fertilizer with a nitrogen to phosphate ratio between 1:2 and 1:5. You can apply it as a mixed fertilizer, or you can broadcast all of the nitrogen that you plan to use and then drill the phosphorus with the wheat.

On claypan soils, where little leaching occurs, you can apply all of your nitrogen in the fall and avoid spring topdressing. Responses from fall-applied nitrogen average one to two bushels below those of spring applications. But in some years wet soils make spring applications either too late or impossible. Fall applications will avoid this problem.

Fall applications are usually satisfactory on medium-textured well-drained soils. But topdress in the spring on sandy and gravelly soils where leaching is common.

Spring topdressing. Most Illinois wheat fields will respond to nitrogen topdressing. Rely on your own experience with straw height and lodging in previous years on the same or similar fields.

Apply nitrogen about the time wheat greens up. On level fields, you may apply it on frozen ground. On sloping fields, let the ground thaw to prevent runoff loss. If wet soil forces you to delay application, you may still apply nitrogen until the wheat is 8 to 10 inches tall. Refer to the table on the back for total nitrogen rates. Subtract the amount applied at planting time to find the rate to topdress in the spring.

Amounts of Nitrogen Suggested for Different Soil Situations

Soil situation	Total nitrogen, fall and spring	
	With alfalfa or clover seeding	No seeding
	(lb. per acre)	
Low in organic matter, no manure or clover for two years	40-50	50-60
Medium in nitrogen-supplying capacity	20-50	30-50
High in nitrogen-supplying capacity (includes light-colored soils that have recently had legumes or manure and dark-colored soils)	0	20-30

Recent research shows that new soft wheat varieties respond more to nitrogen than hard wheats. If you have a stiff-strawed soft wheat, try an extra 25 pounds of nitrogen per acre on part of it.

Generally the minimum practical application is about 20 pounds. At lower rates, spreading costs become too high in relation to the amount of plant food that is applied.

In planning your wheat fertility program, consider all three fertilizer elements, phosphorus, potassium, and nitrogen. One alone won't do the job. Your wheat plants need all three.

For first-hand information for conditions in your county, check with your county extension farm adviser. He can give you specific recommendations to fit your soils.

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No. 255 (Rev.)

CHEMICAL DRYING OF WEEDS IN SOYBEANS

Green weeds in soybeans at harvest time often make combining difficult. How about using chemical defoliant or desiccants? Will they pay? Defoliant cause the leaves to drop. A desiccant causes the plant to dry out but does not necessarily cause leaf-drop.

Several such chemicals have label clearance for use on cotton, but most of them are not approved for use on soybeans to be used for food or feed. Be sure to check the container label for approved uses, as well as for rates and time of application, before using any agricultural chemical.

In soybeans, maturity is accompanied by a rapid dropping of leaves and drying of stems. The final maturing process is so rapid that chemicals applied early enough to cause leaf-dropping will also reduce yields. The following data are from a study at the University of Illinois:

Date chemical applied	Stage of maturity	Check plot	Treated plot
		bu./acre	bu./acre
August 28	1% leaves yellow	35	24
September 2	8% leaves yellow	35	28
September 6	75% leaves yellow	35	30
September 10	50% leaf drop	35	35
September 14	Mature	35	35

Note that defoliant or desiccant applied before the beans matured reduced yields. Materials are evidently still moving out of the leaves and into the seed even a few days before maturity.

It is still possible to apply chemicals to dry weeds after the crop is mature, but it requires an extra field operation and may delay harvest. Also, the equipment used to apply the chemical after the beans are mature may cause some beans to shatter. Even if the chemical dries some of the weeds, much of the weed plant will still remain to cause trouble. Chemicals may help to dry weeds, but they do not get rid of large, stiff stems and seeds of weeds like velvetleaf and pigweed. Desiccants may remove some of the moisture from grasses like foxtail, but the wiry stems will still remain. So it's doubtful whether the benefits from applying desiccants for drying weeds in soybeans would be sufficient to pay for their use.

The best way to avoid trouble with weeds at combining time is to use good cultural and chemical control methods early in the season. If you can control the early weeds, soybeans will usually compete well with the late-season weeds. Use a rotary hoe. Do a good job of cultivating the rows. Consider applying pre-emergence herbicides next year if cultivation isn't doing the job.

* This revision corrects errors in the table figures. Please discard No. 255, sent previously.

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No. 256

NOW YOU CAN CONTROL QUACK

If you farm in northern Illinois, it's likely that quackgrass is your worst perennial grass weed. "Quack" means double trouble. First, it steals moisture and nutrients from the crop. Then, to add insult to injury, it releases a toxic substance that inhibits the growth of crop roots. A cool-season grass, quackgrass spreads both from seed and from underground stems (rhizomes). These straw-colored rhizomes creep along under the soil, sending up new shoots as they go.

But you no longer need to let quack bite into your yields. Results on test plots and in farmers' fields show that modern methods can control this pest. Atrazine is the key. Fortunately, quack is very sensitive to atrazine. Corn, on the other hand, has excellent tolerance to it. Most control methods are based on this principle.

You can use atrazine in several ways. Some methods give a little better control than others, but the main point is to decide which treatment best fits your cropping sequence and time schedule.

First of all, be sure to apply atrazine wettable powder as a spray. Use about 30 gallons of water per acre. Don't use granules. The spray acts through the leaves as well as through the roots. Granules roll off the leaves, give less control, and may cause more soil residue problems.

When should you treat? The best time is fall or spring, when quack is making its most active growth. You can apply atrazine to quack in your corn or soybean stubble. Or you can put it on pasture, hay, or conservation reserve land that will go into corn in the spring. For fall treatment try to apply early enough to allow 2 to 4 weeks of active growth before freezing weather.

Four pounds of actual atrazine (5 pounds of the 80% wettable powder) per acre has given good control. Be sure your sprayer is working properly, agitating the wettable powder well in the tank, and applying it uniformly on the field. Be sure not to exceed this rate. Don't overdose by lapping or covering the same area more than once. Shut off the sprayer in plenty of time when stopping or turning.

If the quackgrass is mostly in patches rather than in a uniform stand, spray only the patches. Four pounds of atrazine per acre is a relatively high amount. If you apply higher amounts or treat areas where there is no quack, atrazine may damage small grains, soybeans, or vegetables on the field in later years. And don't use atrazine on lawns.

Quack and corn help decompose the atrazine. But, to be on the safe side, plant corn for two successive years after the atrazine application, and don't apply atrazine to the last year of corn just prior to some other crop. Following these precautions will help you avoid a carry-over problem.

Fall treatment has usually given a little better control than spring treatment, and it allows more time for atrazine to decompose. However, if you prefer, you can apply the four-pound rate (5 pounds 8OW) in the spring after quack has resumed active growth. Take the same precautions as with the fall treatment. Or you can split this spring application, applying two pounds of active atrazine ($2\frac{1}{2}$ pounds 8OW) per acre to the quack before plowing and another two pounds as a pre-emergence spray at planting time. This split application often controls annuals better than the one-shot fall or spring treatment, and quack control has been almost as good.

Other chemicals can team up with atrazine to kill quackgrass. For instance, if you'd prefer to use lower rates of atrazine, you can apply one gallon of amitrole-T per acre in the spring to actively growing quack. Then plow 10 to 14 days later, plant corn, and apply atrazine as a pre-emergence at planting time (two pounds active rate broadcast for light-colored soils or three pounds for dark soils).

Dalapon can also kill quack. There is little danger that dalapon will carry over in the soil when applied in the fall. But spring applications may damage corn unless you have four to five weeks of sufficiently warm, moist weather between application and planting.

Research now shows that you can control quackgrass. In fact, these treatments are among the most practical and effective of any modern weed control methods. Pick the one that fits your operation. You need not put up with quack any longer.

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No. 257

SHREDDED CORN STALKS HELP CONTROL EROSION

Shredded cornstalks can help you control winter erosion in your cornfield. Recent tests show that you control erosion best when you shred your stalks but don't disk them into the soil.

The secret is ground cover. Shredded cornstalks make a cushion, protecting the soil from the impact of raindrops. It's this impact that first detaches your soil particles, freeing them to be carried away.

Raindrops release a surprising amount of energy when they hit the soil. For instance, the impact of rain falling at the rate of 2 inches per hour releases enough energy to lift the top six inches of your soil three feet into the air 86 times. The harder it rains, the greater the amount of energy released--and the more your soil can disintegrate.

In the Midwest 25 percent of our heavy rains come during the fall, winter, and early spring. It's therefore best not to plow sloping land in the fall. Raindrops work on the bare soil and can soon start it moving downhill.

Recent Indiana studies showed the advantage of shredding cornstalks to provide soil cover. On land that had a 4 percent slope, USDA researchers compared (1) shredded cornstalks, (2) cornstalks left by the picker, and (3) cornstalks shredded and disked in. They simulated rainfall at 2.4 inches per hour for one hour on each plot.

The greatest soil losses occurred where stalks were neither shredded nor disked. Here the loss measured 1.25 tons of topsoil per acre for this hour period. Where stalks were shredded and disked, losses were about one ton of soil per acre. The researchers got the best soil protection when they shredded cornstalks but did not disk. Here they reduced erosion to only one-half ton of soil per acre.

How much is it worth to you to save an inch of topsoil? That depends on how deep your soil is and what your subsoil is like. If your soil is deep, you won't miss an inch as much as the fellow who has only a few inches of topsoil over clay.

But even on the best soils it's the most fertile portion that washes off. It costs money to replace the nitrogen lost in the organic material that washes away. So it costs more to grow corn after your soil has eroded.

In shallow soils, where the subsoil is clay, topsoil losses become even more serious. With less surface soil, crop roots won't be able to go as deep as before. This condition may also restrict moisture movement and water penetration. You may never rebuild such soil--regardless of how much fertilizer you put on. Here the best bet is to hold on to all the soil that's there.

Growing good crops helps to reduce erosion. The higher your corn yields, the more plant material you have. A good stand of vigorous corn plants provides a fine canopy to fend off raindrops during the summer. Then you'll have lots of material for shredding in the fall. A 100-bushel corn crop produces nearly three tons of stalks per acre. Properly shredded and spread, these stalks can almost completely protect your soil from the impact of raindrops.

So good seed, high fertility, and good cropping practices do more than produce high yields. They also give you lots of cornstalks--and shredding these stalks can "pay off big" in protecting your soil from erosion.

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CROPS AND SOILS

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November 11, 1963

No. 258

CONTROL OF WILD GARLIC AND WILD ONION

Can you afford to lose \$4.00 on each acre of wheat you produce each year? Many farmers, especially in southern Illinois, lose this much or more every year. Wild onion and wild garlic cost Illinois farmers over half a million dollars each year through dockage of wheat. Add to this the loss in value of contaminated milk and meat products, and the cost would be considerably higher.

Wild garlic and wild onion, like garden onions, are cool-season plants. They start their new growth in the fall with the coming of rains and cool weather. The young plants remain semidormant through the winter and resume active growth in the spring. In May bulblets begin to form at the top of each plant. These bulblets mature and are harvested along with wheat or other small grains. Wheat containing bulblets may be docked as much as 6 to 12 cents per bushel when sold at the elevator.

Chemical Control

Fall is a good time to control wild garlic and wild onion in corn and soybean stubble and grass pastures. You can nearly eliminate wild garlic and wild onion on these areas by applying 2,4-D ester at the rate of 2 to 3 pounds per acre for several years. For good coverage, use 10 gallons of water per acre. Use the ester form of 2,4-D; it packs more wallop than the amine form and does a much better job on garlic and onion. Spray when the garlic and onion are 4 to 6 inches tall. They are most sensitive to 2,4-D at this stage; as they mature they become more resistant to 2,4-D. They generally reach this sensitive 4- to 6-inch stage in late October or early November. Winter-plow if possible, but delay plowing for three or four weeks after treatment. Since some of the garlic and onion bulblets may not germinate until next spring, spraying may be repeated in late February, March, or early April.

Cultural Control

Although chemicals will give better control, late fall plowing (November and December) followed by a cultivated crop (corn or soybeans) will do much to control wild garlic and wild onion.

Spring Control in Wheat

Never apply 2,4-D on wheat in the fall, since it is susceptible at this time. But if you have wild garlic or wild onion in your wheat, you can apply a low rate of 2,4-D in the spring after the wheat has finished tillering but before the heads

emerge. Spraying about the first week in April with 1/2 pound of 2,4-D ester in 10 gallons of water per acre has had little effect on wheat yields, but has reduced aerial bulblet formation an average of 50 percent. In addition, the remaining wild garlic and wild onion have been so deformed that the combine will pick up very few of them.

Remember, 2,4-D will kill alfalfa, clover, and other legumes. Always read the label before using any chemical.

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AGRONOMY

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December 20, 1963

No. 259

WINTER BRUSH CONTROL

The winter months may give you time to catch up on chores like cleaning out brush along fencerows and ditches on the "back 40." With 2,4,5-T, you can kill this brush practically and easily during the winter.

There are advantages to winter or dormant-season treatments. They'll control large trees and hard-to-kill species like oaks and maples more effectively than foliage treatments applied during the growing season. And you'll be less likely to damage nearby plants that you want to keep.

But even in winter, if you're spraying near orchards or ornamental trees and shrubs, do the job when there is little wind. Be sure your spray--and any drift from it--hits only the brush you want to kill.

For best results, choose the ester form of 2,4,5-T for dormant-season treatment. It kills more species and is more effective than either 2,4-D or 2,4-D and 2,4,5-T mixtures.

Some woody plants are so tough that even 2,4,5-T will not always give a complete kill the first time. Here you may have to follow up with another treatment the next year.

Let treated brush stand for at least one year after treating. This period gives the herbicide time to penetrate deeply and lessens the chance of regrowth.

Use a basal bark treatment, spraying or painting the lower part of the tree trunk with a gallon of 2,4,5-T containing 4 pounds of active ingredient to 25 gallons of kerosene, diesel oil or fuel oil. This is the same as one pint in three gallons of oil.

Be sure to completely encircle the trunk and cover it thoroughly to a height of 15 inches above the ground. Apply the spray until it runs down the bark and begins to wet the soil. An oil-soluble dye or a little paint mixed into the spray will help you mark the treated areas. One gallon of spray material will treat about 33 trees 3 inches in diameter or about 50 trees 2 inches in diameter.

For dense stands, try using both foliage sprays during the growing season and winter sprays. It may be hard to apply basal sprays to such stands because you'll have so many stems to treat. And foliage sprays are only partly effective in dense stands. So use a foliage spray to thin the stand, and then kill the remaining plants the next winter with a basal spray.

The cut-surface treatment works best for trees over 4 inches. They often have bark too thick for basal sprays to penetrate well. Apply the herbicide through cuts or "frills" in the bark. You can make a frill by ringing the trunk of the tree with overlapping axe cuts that penetrate the sap wood at least one-quarter inch. Fill these frills with the basal spray solution given above.

Stump treatment helps to prevent regrowth. Apply 2,4,5-T soon after cutting. Again, use the mixture recommended for the basal bark treatment. Spray or paint the tops and sides of the stumps until the solution begins to run off.

While not adapted to winter use, several effective brush-killers are available as granules or pellets for soil treatment. Among them are Dybar and Urab. You can apply these any time the ground is unfrozen. Late winter or early spring applications usually give best results. Apply these dry materials in a circle halfway between the trunk and the outmost reaches of the branches--the "dripline." Rain dissolves the herbicide and carries it down into the root zone. Do not apply this material near desirable trees, since their roots may grow into the treated area. To kill solid stands, you may want to use broadcast applications instead of spot treatments.

Whenever you use a herbicide, be sure to read the instructions on the label and follow them carefully.

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No. 260

LEGUME-GRASS DRILL BOX SURVEY

It will pay you to buy your legume and grass seeds from a reputable seed dealer. It also pays to read the tag on the bag. Otherwise, you may plant low-vigor or even weedy seed. That's what a two-year drill box survey conducted by the University of Illinois Cooperative Extension Service and the Division of Plant Industry shows.

During the past two springs, many Illinois farm advisers asked several farmers in their counties what forage crops they were planting and picked up a sample of the seed. Then they sent the seed samples to the Division of Plant Industry of the State Department of Agriculture for germination and purity analyses. U. of I. agronomists summarized the information from these tests and from the questionnaire used in the survey.

One of the most surprising results was that 20 percent of the samples collected in both years germinated only 79 percent or less. A few wouldn't grow at all.

Alfalfa and red clover were the most popular legumes in both 1962 and 1963 surveys. Timothy was the most popular grass and orchardgrass was second.

Most of the farmers planned only a short life for their new seedlings. Eighty-five percent of those contacted in 1962 and 88 percent of those in 1963 expected to plow up the seeding by at least the end of the second harvest year. About one-fourth of these fields were to be plowed for soil-improving purposes within the first 12 months after establishment.

Most of the farmers were planting high-quality seed. Only 6 percent in 1962 and 4 percent in 1963 planted seed that carried excessive weed seed. With but one exception, the samples with excessive weed seeds were grown on the farmer's own land or on his neighbor's land and were not cleaned before planting or were inadequately cleaned. These farmers were replanting their own or their neighbor's seed problem. One farmer was planting 114,265 buckhorn seeds plus 16,320 giant foxtail seeds per acre in home-grown uncleaned red clover seed.

This kind of seed is expensive any way you look at it. Giant foxtail, in particular, will be a problem in succeeding corn and soybean crops for many years. Conservatively, controlling this weed in either corn or soybeans will cost about \$5.00 an acre. It never pays to plant your own red clover seed unless it has been cleaned properly. And it takes specialized equipment to remove giant foxtail from red clover.

Why was 20 percent of the seed planted by these farmers low in vigor? About one-half of the seed that germinated 70 percent or below in 1963 had been bought that year. The other half had been carried over from 1962 or 1961. Probably the carry-over seed was vigorous when bought but lost vigor in storage. However, the

seed bought in 1963 must have been low in vigor when it was bought. The buyer either failed to read the germination figure on the label or the germination actually wasn't as high as listed on the label. Or possibly he thought the difference in price between this seed and vigorous seed offset the disadvantage of low germination. This assumption can easily be false economy. There are almost 11 pounds more germinating seed in a 100-pound bag with a germination rate of 90 percent and containing 99.5 percent pure seed than in a bag of seed with the same purity but germinating only 79 percent.

It pays to read the tag or label before buying seed. And it pays to run a germination test on carry-over seed.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

This material is for your information.

W. O. Scott
Extension Agronomist

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United States Department of Agriculture
University of Illinois
Urbana, Illinois

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AGRONOMY

CROPS AND SOILS

NEWS

COLLEGE OF AGRICULTURE

UNIVERSITY OF ILLINOIS

URBANA

FEB 21 1964

UNIVERSITY OF ILLINOIS No. 261

February 7, 1964

ALFALFA VARIETIES FOR 1964

Are you planning to buy alfalfa seed this year? If so, it will pay you to choose one of the first-rate new varieties that are now available. Pick the one that suits your farm and your needs. Here's a run-down on the best of these new varieties, those that have proved themselves in Illinois tests and on Illinois farms.

DuPuits, Alfa, FD-100. These three varieties originate in Europe and are often referred to as Flemish or Flamande-type alfalfas. In Illinois tests they have performed alike. All three are fast growing, early maturing, and high yielding, and all are well designed for farmers seeking top production. They bounce back after cutting or grazing faster than other types and are more tolerant of leafhoppers and leaf diseases. All three are susceptible to bacterial wilt, a disease that can thin stands in the third harvest year. For this reason they are recommended for short rotations, where alfalfa is left down only one or two years.

The fast growth and early maturity of DuPuits, Alfa, and FD-100 contribute to high yield, but also add some problems. They all begin to flower a week to 10 days ahead of Ranger, Vernal, and the common alfalfas.

Since quality falls off once alfalfa begins to flower, you should cut these varieties earlier than others. Best cutting dates for Flemish varieties range from early May in southern Illinois to very early June in the northern counties. So they are best suited to the farmer who is equipped and willing to cut early. Delayed cutting reduces both palatability and digestibility.

Northern Illinois farmers growing DuPuits, Alfa, or FD-100 should plan to harvest three times a year; those in central and southern Illinois, four times. Managed in this way, these varieties will provide top yields of high-quality forage. More frequent cuttings are possible and will increase quality but tend to reduce yield. The good manager who is looking for top production from his forage acreage will like these varieties.

Although DuPuits, Alfa, and FD-100 originated in Europe, seed growers now produce seed under American certification in the western states. With this seed, you can be sure you're getting what you pay for.

Vernal also has an outstanding record in Illinois. It is resistant to bacterial wilt, so you can grow it for three or more harvest years. Vernal also has more tolerance to leafhoppers than Ranger or common alfalfas. It generally outyields Ranger by at least one-half ton of hay per acre per year. In short rotations it will not equal DuPuits, Alfa, or FD-100 in yield, but it is easier to manage, since it matures a week to 10 days later.

Vernal should be first choice for pasture, since it has a broad crown that enables it to withstand grazing better than other alfalfa varieties. It is an excellent general-purpose variety that is well adapted anywhere in Illinois. Farmers who are not willing or not equipped to cut the Flemish varieties early will find Vernal better suited to their operation.

Buffalo, a favorite for many years, still does well in southern Illinois. Developed in Kansas, it combines resistance to bacterial wilt and high yielding ability. In trials at Brownstown and Carbondale, Buffalo has been superior to Ranger, but sometimes not equal to Vernal. Because it has not been a profitable variety for western seed producers, seed supplies are short and will probably become even shorter.

Cody, new in 1963, was developed in Kansas from plants selected from Buffalo for resistance to the spotted alfalfa aphid. So far this insect has not been a problem in Illinois. In other respects the variety performs about like Buffalo and offers an excellent substitute for it. Cody seed will probably be more plentiful than Buffalo during the next few years and will cost less.

Ranger has been popular for many years. Developed in the early 1940s in Nebraska, it was the first alfalfa variety well adapted to the northern United States that was resistant to bacterial wilt. Ranger is still by far the most widely used variety in Illinois, but it is becoming outdated. In yield it falls far behind DuPuits, Alfa, and FD-100. And Vernal generally outyields Ranger by over one-half ton per acre per year. Ranger is highly susceptible to leafhopper injury, much more so than Vernal or the Flemish alfalfas. But Ranger is still preferable to the common alfalfa types, such as Kansas, Oklahoma, or Washington.

Many other varieties are now in Illinois tests. Some of them look good; others are not measuring up. The varieties listed above have proved their ability to do well from year to year and from county to county in Illinois. And, most important, they've proved that they can give you greater yields per acre. Spending a few extra dollars for one of these improved varieties may return you many tons of forage.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

This material is for your information.

W. D. Pardee
Extension Agronomist

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United States Department of Agriculture
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AGRONOMY NEWS

crops and soils

February 10, 1964

MERIT LADINO CLOVER

No. 262

Do you seed ladino clover in your pasture mixtures? If so, you'll find a new improved variety available this spring. Named Merit, it has more drought resistance, winter-hardiness, and insect resistance than lines presently in use.

Merit ladino clover was developed by plant breeders at Iowa State University. Their breeding methods were deceptively simple, and yet highly effective. First they planted a large breeding nursery with many ladino strains and types. Then they let nature take its course for several years. Hard winters killed out the winter-tender plants. Summer droughts pruned out those that were unable to take dry weather. Meanwhile, insects knocked out the plants they found most tasty.

After several years the plant breeders went back into the field to check on the survivors. From them they chose the 30 most vigorous plants. They transplanted them in one area and allowed them to cross-pollinate. From this block, they harvested seed that became parent stock for a new variety.

Exhaustive testing followed. Agronomists at Iowa, Illinois, New York, and other experiment stations tested the fledgling variety against the best available ladino strains. And time after time the newcomer demonstrated its superiority.

Encouraged, Iowa plant breeders named the variety Merit and began to increase its seed for use by midwest farmers. This spring certified seed of Merit ladino clover will be available in Illinois and other corn-belt states.

Merit has done well in Illinois trials. In tests at DeKalb, it outyielded other ladino strains by 400 to 600 pounds of dry hay per year. It also lived longer; for instance, it survived the hard winter of 1958-59 while other lines were almost completely killed out. And during summer drought at both Urbana and DeKalb, it has rated higher in vigor than any other variety.

Merit has also shown resistance to certain insects, particularly leafhoppers, which generally find ladino clover to their liking. Often these pests reduce both yield and quality of ladino forage. But leafhoppers apparently find Merit less attractive than other clovers and tend to feed elsewhere.

So Merit not only outyields other varieties, but will be more likely to survive in your pastures. If you plan to seed ladino this year, you'll get best performance from certified Merit ladino clover.

Cooperative Extension Service, College of Agriculture, University of Illinois
U. S. Department of Agriculture, Cooperating, Urbana, Illinois

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AGRONOMY NEWS

crops and soils

February 13, 1964

NEW SOYBEAN VARIETIES NOW AVAILABLE

No. 263

This spring you'll be hearing a great deal about three outstanding new soybean varieties, Harosoy 63, Hawkeye 63, and Clark 63. Each of these varieties behaves just like its namesake--except for one important difference: These new varieties resist the dangerous soybean disease, phytophthora rot.

This disease can cause serious losses--particularly during warm, damp weather or in wet areas of your fields. The phytophthora fungus lives in the soil, infecting the roots and lower stems of plants. The infected parts rot, shutting off the plant's supply of water and nutrients.

U. S. Regional Soybean Laboratory personnel report that phytophthora probably is present in all Illinois counties. They point out that some farmers have already suffered severe losses from this disease. A wet spring followed by a warm, humid June could trigger a serious outbreak.

In 1963, dry weather prevented a serious attack, though phytophthora appeared in some fields late in the season.

These new varieties have consistently outyielded their older counterparts when phytophthora was present. How did they compare in 1963 when the disease was absent? In an average of tests spread over the entire state, the new varieties matched their namesakes, demonstrating their ability to yield well even when phytophthora is absent.

For instance, in United States Regional Soybean Laboratory trials at Shabbona and Dwight in northern Illinois, Harosoy and Harosoy 63 both averaged 41.6 bushels per acre. In the same tests, Hawkeye 63 made 34.5 bushels, while Hawkeye made 32 bushels. Farther south, at Urbana, yields again were almost identical for the phytophthora-susceptible parents and their resistant namesakes.

In south-central Illinois, where later-maturing beans do well, Clark 63 averaged 42.5 bushels per acre. Clark was practically equal at 42.4 bushels. Yields from over 60 county demonstrations showed the same picture. Leading farmers, county extension farm advisers, and University of Illinois agronomists cooperated in obtaining these results. In north-central Illinois, Harosoy and Harosoy 63 both averaged 41 bushels per acre, and Hawkeye and Hawkeye 63 both hit 40 bushels. In south-central Illinois, Harosoy averaged 41 bushels per acre and Harosoy 63 made 40 bushels. In the same area, Clark 63 made 44 bushels while Clark made 42 bushels.

These varieties have now demonstrated that they will equal their older namesakes when phytophthora is absent. Past tests have shown that they can outyield their susceptible parents by high margins when the disease hits. In a recent test in

south-central Illinois, Harosoy was nearly killed by phytophthora, producing only 13 bushels per acre. Harosoy 63, standing right at its side, was able to fend off the disease and produced over 40 bushels per acre.

Phytophthora rot has come to Illinois, and it's here to stay. In a serious outbreak, only resistant varieties will return a crop. You can buy certified seed of these varieties this year--but supplies are going fast. Harosoy 63, Hawkeye 63, and Clark 63 offer resistance to a disease that can cut your yields drastically. You'll find these varieties a good bet for your 1964 planting.

W. D. Pardee

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Urbana, Illinois

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AGRONOMY NEWS

crops and soils

February 21, 1964

OPEN HOUSE AT TURNER HALL

No. 264

Agronomy extension has a new home. We're now settling down in the completed portion of the new Plant Science Building--now named Turner Hall.

We're proud of our new facilities here--facilities that will help us do a better job of bringing the latest results of research to you as quickly as possible.

We're so proud of our new quarters that we'd like to invite you to see them too. So we're holding a housewarming, an open house, for all comers on March 6 (Friday) from 9 a.m. to 12 noon and from 3:30 to 6 p.m.--and on Saturday, March 7, from 9 a.m. to 12 noon.

We in Agronomy extension will join with our colleagues in research and teaching in showing you the many new teaching and research facilities we'll have available.



Dedication Ceremonies. To cap the event, we've planned a dedication program, with top state and national agricultural leaders to help us look into the future.

Here is the program--scheduled for the University Auditorium from 1 to 3 p.m. on Friday, March 6:

Chairman. Dr. L. B. Howard, Dean, College of Agriculture, University of Illinois

Remarks Dr. D. D. Henry, President University of Illinois

Continuing Opportunities
for Cooperative Research
in Agriculture.

Dr. Nyle Brady, Director, Division
of Science and Education, USDA,
Washington, D. C.

Planting a Straight Row . . Dr. Earl Hughes, Farmer, Former
Assistant Secretary of Agriculture
and member of the Board of Trustees
of the University of Illinois

Horizons in Agronomy. . . . Dr. M. B. Russell, Associate Direc-
tor, Illinois Agricultural Experi-
ment Station, University of Illinois

We're particularly looking forward to this portion of our housewarming. Each of these speakers is a "thought" leader in his field. We're sure that new and stimulating ideas will be offered--for ourselves and for you.

Free Parking. To handle the cars of the many guests we expect, we've arranged for free parking in the lot just south of Florida Avenue at the southeast corner of the cemetery. Florida Avenue runs east and west and connects with Kirby Avenue, which runs between the Stadium and the new Assembly Hall. You can reach Florida from Vine, Race, and Lincoln streets in Urbana and from Prospect and Neil streets in Champaign. You'll find Florida near the southern borders of Urbana, and Kirby near the south end of Champaign.

We're planning on lots of folks--we'll have demonstrations set up and the whole Agronomy staff will be present to show what we're doing--in research, teaching, and extension.

We hope you can come. And bring your wife! We're looking forward to visiting with you.

W. D. Pardee
Extension Agronomist

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ILLINOIS



AGRONOMY NEWS

crops and soils

February 25, 1964

No. 265

INCREASE YOUR RETURNS FROM OATS

If you grow oats, it makes sense to shoot for top returns. Last year many Illinois farmers harvested over 100 bushels of oats per acre. Many of these same farmers then baled off two or more tons of straw per acre and followed up with some stubble grazing. While doing all this, they also established alfalfa seedings that they'll use for years to come.

How can you get returns like this from your oats? Here are some pointers, drawn from recent research:

First, select a top variety. In northern Illinois, Shield and Garland have made top yield records for the past several years. Newton, Beedee, Dodge, and Clintland 60 also have done well. Or, if you have lodging problems, stiff-strawed Goodfield may be your choice. In central Illinois, Newton and Garland are top yielders, while Clintland 60 and Minhafer also do well. Farther south, Newton and Putnam 61 have been the best choices.

Buy good seed. Certified seed is your best guarantee that you'll get what you pay for. And buy from a reputable seed dealer, one who takes pride in the quality of his seed, not in its low price.

Plant treated seed. Not only do chemical seed treatments help kill off diseases carried on the seed, but they also protect the germinating seed in the soil. Tests show that you'll get better stands from treated seed. U. of I. plant pathologists report that treated oats average three bushels per acre more grain than untreated oats.

Prepare a good seedbed. Once over with a disk won't bury heavy cornstalks. Plowing is best--there's no question about it. But if plowing is not practical, you'll get better oat yields if you shred your stalks and disk the ground well.

Fertilize. Too often oats get only the leftovers. They have to live on plant food left by the corn crop--or by soybeans.

For instance, nitrogen can often boost your returns. New varieties have stiffer straw, stand better, and respond more to nitrogen than older varieties.

If you're farming timber soil and have put little manure on the field, then 40 to 60 pounds of nitrogen should give you a profitable yield kick. But if you're on prairie soil and have grown lots of legumes in your rotation and have put tons of manure on the field, then nitrogen won't pay. If you've had troubles with oats lodging in the past few years, then you should steer clear of nitrogen. But if your oats haven't lodged, you may be able to push up your yield with nitrogen.

Oats can use soluble phosphorus for a fast start in the spring. Oats need phosphorus in a hurry, and soluble forms are more readily available than rock phosphate. And your legume seeding may need both phosphorus and potassium. To find how much of these nutrients you need, there's no substitute for a soil test. Your county extension farm adviser can advise you how to take your samples and where to have your soil tested. He can also help you with fertility recommendations.

Plant early. Oats are a cool-weather crop. Illinois is a little south of the best climate for oats, but early planting can help to overcome this difference. Get out as soon as you can get the land ready. Tests in several states show that you'll lose roughly one bushel per acre for every day that you delay seeding your oats.

Use a drill. Illinois tests show that you'll get 7 to 10 bushels extra for drilling instead of broadcasting oats. If your acreage is small, then it may not pay you to buy a drill. But if your acreage is large, or if you plan to grow oats for years, it will pay you to buy, borrow, or find a drill at oat-planting time.

You may also be able to increase your returns from oats by harvesting them for forage. Last year Illinois agronomists harvested nearly 10 tons of oat silage--cut just at heading stage. This silage produced almost twice as much TDN per acre as oats from nearby plots that averaged 110 bushels of grain per acre. With the oats cut this early, the alfalfa came on despite dry weather and gave a fine hay cutting in September. And the alfalfa stands look better where the oats were cut for forage than where they were left for grain.

Perhaps you can increase your returns from oats. But, like other crops, oats need a complete program. High fertility won't pay in late-planted oats. Neither will it pay on an outdated variety. On the other hand, the best varieties can't show their merit if fertility is lacking or if seed quality is poor. Many Illinois farmers are putting the pieces together to make a profitable oat-growing program. How about you?

W. D. Pardee
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AGRONOMY NEWS

crops and soils

February 28, 1964

No. 266

SEND FIELD REPORTS WITH YOUR SOIL SAMPLE

Good soil sampling is the first step in getting the most from your fertilizer dollars. But the next step is equally important: preparing a field report to bring with your soil samples to the testing laboratory. This report gives your farm adviser background information for interpreting your soil test results and making your lime and fertilizer recommendations. It helps him get acquainted with your field.

Soil test results alone don't provide a sufficient basis for a fertility recommendation. In your field report you should include information on the soil type, as well as the field's crop and fertilizer history. This added information will help the farm adviser evaluate your test results and make the best recommendations for your field.

Be Sure to Supply the Following Information

Soil Information. The name of the soil is important. If you do not know what it is, you can find it on your S.C.S. farm map. Agronomists have studied soils throughout the state and grouped similar ones together with common names. Your adviser thus has the benefit of many years of research on soils like yours. If you will give him the name of your soil type, he can tell how fertile your subsoil is, how deep the rooting zone is, how much moisture the soil can store, what the yield potential is, how the soil will respond to lime and fertilizer, and what are the most economical rates to use. If you don't know the name of your soil and can't find out, you can still help by describing the soil as sandy, silt loam, clay, or muck; the drainage as good, fair, or poor; and the lay of the land as level, rolling, or steep.

Management History. Your previous lime and fertilizer applications are important too in determining what treatment your soil needs now. For instance, if you've put lime on recently, it may not yet have reacted with the soil. Or recently applied fertilizer may not be mixed in well and may not show up on the soil test. This information can lessen your fertilizer costs.

Previous cropping also can affect recommendations. A plowed-down legume will return nitrogen to the soil and decrease the amount of nitrogen you will need for the following crop. Previous yields are important too. You'll get better recommendations if your adviser knows how near you are to reaching the yield potential of your particular soil.

Briefly, your field report should show your fertilizer program for the past three years, the amount of lime, manure, nitrogen, phosphorus, and potassium you have used per acre, how you applied these materials--whether broadcast or banded near the row--and for what crops you applied them.

You can get field report forms from your farm adviser or fertilizer dealer. It will pay you to send one with your soil samples. Tell the whole story--and you'll get fertilizer recommendations tailored to your field.

T. R. Peck
Extension Agronomist and
Soil Testing Specialist

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AGRONOMY NEWS

crops and soils

March 23, 1964

SPRING WHEAT RECOMMENDATIONS FOR 1964

No. 267

Each year many northern Illinois farmers consider planting spring wheat. This crop can be profitable--but only in the northernmost counties of the state.

If you do plan to sow spring wheat, be sure to plant early--just as soon as you can prepare a good seedbed. Wheat does best in cool, moist weather, so the more early-season growth you can get, the better. Hot, dry weather will force spring wheat to mature early. Early maturity reduces yields and lowers the test weight per bushel. The earlier you plant, the better your chance of getting a good harvest.

At our Northern Illinois Research Center in Shabbona, we tested eight varieties of hard red spring wheat. The results of these tests are given below:

Variety	Yield		Test weight	Lodging
	1963 bu./A.	1960-63 bu./A.	1962-63 lb./bu.	1963 %
Selkirk	49	44	58.7	19
Lee	50	43	60.7	29
Pembina	50	45	58.6	62
Henry	59	48	62.0	12
Lathrop	54	46	61.8	21
Russell	53	47	61.4	8
Crim	53	46	61.0	22
Justin	49	--	--	2

Probably your best bet for all-round performance is Selkirk. This variety produces good yields and high-quality grain that is excellent for milling. It is beardless, has white chaff, and is medium in maturity, with good straw strength. Resistance to stem rust, bunt, and loose smut and moderate resistance to leaf rust add to the merits of this variety. Selkirk's high grain quality often brings a premium price.

Henry, Lathrop, and Russell are feed wheats with low baking quality. These varieties often bring a lower price than others on the market. For maximum profits it makes good sense to choose a high-quality wheat rather than a feed wheat. Pembina is a good yielder, but it lodges severely. Crim and Justin are new varieties that show promise. Both are hard red spring wheats with good milling quality. Seed supplies are extremely short this year. These varieties will bear watching for future use.

Early planting helps to reduce diseases and pests of spring wheat. Scab, a fungus disease, is an ever-present threat to spring wheat in Illinois. The amount of damage depends on the temperature and moisture relationship during heading and early seed development. Scab carries over on straw from other cereal crops, so be sure to completely cover all such residues when plowing. Scab not only reduces grain yield, but seriously lowers market quality and feeding value.

Hessian fly and/or chinch bugs can be a serious threat if spring wheat follows or is close to infested wheat.

The wheat stem maggot is another pest that attacks spring wheat. It chews through the stem at the top node, killing the top of the plant and causing a wheat head.

Illinois agronomists find that spring wheat does best when drilled. Broadcasting is not suitable, as it produces uneven stands and lowers yields.

Treating the seed with a fungicide is a must for spring wheat. The cool, moist conditions that benefit wheat growth are also just right for seed-rotting organisms. Seed treatment allows the seeds to germinate and start growth in a "protected circle."

Spring wheat production is risky, but it can also be profitable. To get the best results, keep these points in mind:

1. Use a high-quality variety (Selkirk).
2. Treat the seed.
3. Prepare a good seedbed.
4. Plant early.

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AGRONOMY NEWS

crops and soils

April 13, 1964

TERMS FOR NUTRIENTS

No. 268

Have you wondered why your fertilizer analysis shows the amount of nitrogen (N) on the elemental basis but the phosphorus (P) is shown as P_2O_5 and the potassium (K) is labeled K_2O ? Did you know that nitrogen was once shown as percent of ammonia (NH_3) but that this was changed many years ago to percent of N?

Agronomists are now conducting an intensive program so that every modern farmer in Illinois will understand the meaning of P, P_2O_5 , K, and K_2O , and so he will know what the new terms mean when he sees them in bulletins, circulars, and farm magazines and on fertilizer bags.

You may already have seen fertilizer bags with a double listing--P and P_2O_5 , K and K_2O . If not, watch for them this year, especially in northern Illinois.

The soil test report forms from the University of Illinois and all extension circulars on soil fertility already use the double system.

Here are some definitions to help you understand what this is all about:

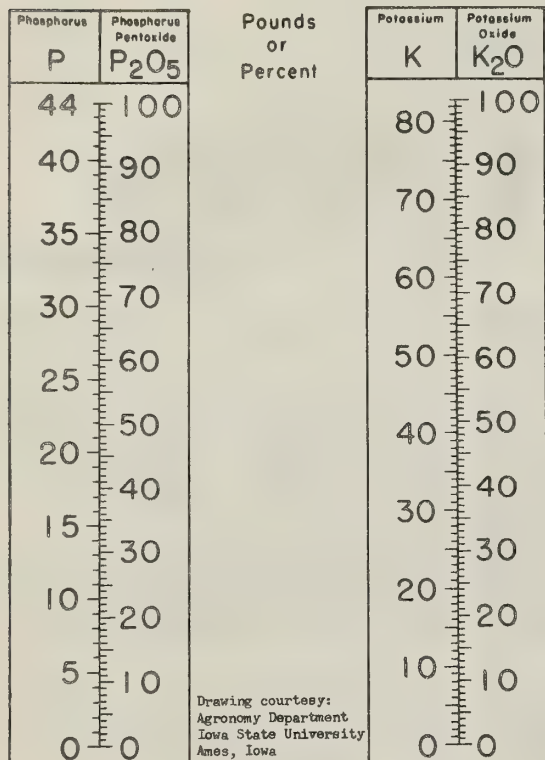
The elemental system shows the actual percent of each plant nutrient, for example, N, P, and K.

The oxide system shows the percent of P_2O_5 and K_2O rather than P and K in the fertilizer.

The fertilizer industry has been using the oxide system for phosphorus and potassium for many years even though the oxides are not found in fertilizers at all. The simplest system is to show all nutrients on the elemental basis. This is the system now followed in nearly all states for nitrogen and all secondary nutrients and micronutrients.

Because of the long history of using P_2O_5 and K_2O , some fertilizer manufacturers are concerned that the change to P and K will be confusing to farmers. It is quite easy to convert P_2O_5 to P, K_2O to K, and vice versa. But it will probably take some time before you automatically think in terms of the elements when you are considering fertilizer rates. To convert P_2O_5 to P, multiply by .44; to change P to P_2O_5 , multiply by 2.29. To convert K_2O to K, multiply by .83; to change K to K_2O , multiply by 1.2.

FERTILIZER CONVERSION CHARTS



This chart supplies a simple gauge to help you with this conversion.

Showing the percentage of P and K rather than P₂O₅ and K₂O will not change the amounts of actual plant nutrients in the fertilizer. However, the apparent concentration of plant nutrients will be somewhat lower--since the percent of P will be less than the percent of P₂O₅, and the percent of K will be less than the percent of K₂O. In both cases the new system no longer considers the oxygen as part of the fertilizer nutrient.

You may have wondered why you can't buy pure N, P, and K in fertilizers. The answer is that they must be chemically combined with other elements so that you can handle them. Nitrogen is a gas that would immediately be lost to the atmosphere upon exposure. Pure phosphorus bursts into flame when exposed to air. Potassium is extremely caustic and causes severe burns upon contact.

Look for this new labeling system.

S. R. Aldrich
Extension Agronomist

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AGRONOMY NEWS

crops and soils

April 15, 1964

HAS THE FERTILITY QUACK CALLED ON YOU?

No. 269

How to Spot the Quack.--Have you been offered one of the "miracle" products this year? Usually the salesman is a persuasive talker who makes great claims for his product. Evidently he looks upon farmers as easy prey. Here are some of the ways to spot the fertility quack:

1. He claims mysterious benefits from unlocking the nutrients in your soil, often with material from some unusual natural deposit.
2. He makes no guarantee for nitrogen, phosphorus, or potassium and thus neatly avoids the regulations of the Illinois fertilizer law. Sometimes the benefits he claims are from micronutrients (trace elements) or from a soil "conditioner." Usually the micronutrient content isn't guaranteed, and you have no way of knowing whether the nutrients, if present, are in a form that is available to plants. Usually the analysis shows several elements that are not used in plant growth.
3. He has no research results from an unbiased source to back up his claims. He often has testimonials from farmers in other states, but you have no way of knowing whether the conditions under which the observations were made would produce results or whether the results apply to your conditions.
4. When asked what the county farm adviser thinks of the product, the quack often says "Don't ask him." He probably wouldn't know the value of our product or recommend it."
5. He usually runs down the agronomist at the University of Illinois and often says, "They won't test our product."

Sources of Reliable Information.--By following fertilizer practices based upon research of the Agronomy Department at the University of Illinois and other mid-west colleges of agriculture, Illinois farmers have increased their yields of corn, soybeans, wheat, and other crops at fantastic rates during the past 25 years. If you need information or advice on fertility practices, contact your farm adviser and legitimate fertilizer dealers. Above all, be sure to seek advice before you sign up for a dealership for an unproven product.

We in the Agronomy Department regularly test new products that show promise of being of value to Illinois farmers. We obviously cannot test all new products immediately, since both our budget and our manpower are limited. Many suppliers who have confidence in their products have helped provide financial support for the research. We use this financial help to hire one or more graduate students to conduct research on the product. This often helps speed up the testing. However, this support never pays the total cost of the study.

Occasionally we are asked to test products that we do not believe have any possible value for Illinois farmers. We turn down these requests regardless of whether financial support is offered. We cannot justify the time of professional staff and use of facilities for projects that have no potential value to the state.

WHAT ABOUT GYPSUM AND VERY HEAVY LIMING RATES?

This spring many Illinois farmers are being advised to apply up to 15 tons or more of limestone per acre, and even to apply limestone on soils that are already neutral (pH 7 or above). There are no theoretical reasons or research results to support these excessive rates of liming. Limestone is essentially insoluble and thus is ineffective in a neutral soil. Liming a soil that is already alkaline reduces the available phosphorus and aggravates a manganese deficiency if it exists for soybeans and oats.

Gypsum has not proved to be a substitute for limestone in Illinois because the problems on acid soils are related to pH (degree of acidity) rather than to the supply of calcium. Gypsum supplies calcium but does not reduce soil acidity.

Gypsum is effective on alkali soils in the arid west because the problem there is excess sodium. The calcium in gypsum replaces sodium, which can then be washed out of the soil, usually by flooding with irrigation water. Sodium is not the problem in alkaline soils in the northern two-thirds of Illinois, and thus gypsum should not be expected to improve them.

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United States Department of Agriculture
University of Illinois
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AGRONOMY NEWS

crops and soils

April 17, 1964

No. 270

ANY CHANGES IN CORN-GROWING PRACTICES FOR 1964?

As this is written it is raining and the surface soil in Illinois is wet. The deep subsoil has still not been recharged in many places, particularly in northern Illinois. If rainfall between now and corn-planting time is inadequate to re-charge your subsoil moisture, here are some guidelines to consider in arriving at your fertilizer and planting rates:

1. Optimum fertilization increases the efficiency of an inadequate water supply. Therefore, the standard rates of preplant and row fertilizer are likely to be most profitable in 1964. Farmers who sidedress most of their nitrogen may want to use a moderate rate rather than a very heavy rate if it is still dry by mid-June and the long-range forecast at that time is for below-average rainfall.
2. Water use is not directly proportional to population. Surprising as it may seem, populations of 12,000, 16,000, and 18,000 plants per acre use about the same total amount of water. High populations shade the soil more completely, and thus less moisture is lost by evaporation. Besides, in thick stands the lower corn leaves are shaded more by upper leaves, and this also tends to equalize moisture lost between low, medium, and high populations.
3. About 15,000 to 16,000 plants is a good goal for medium fertility levels, and 17,000 to 19,000 for high fertility. Assuming that 90 percent of the kernels make plants, you will need to plant 1,500 to 2,000 extra kernels to obtain these populations. The drop-off in yield above the optimum population (for any given moisture supply) is less rapid than farmers thought prior to 1963. You may wonder what happens to yield if the best population in a dry summer turns out to be 16,000 but you have 18,000. Rest assured that the extra 2,000 plants won't have much effect on your yield. Aiming for 20,000 to 24,000 may, however, be more hazardous than usual this year.
4. The odds are fairly good that we will receive substantial rainfall (though not necessarily optimum amounts) from May 15 to September 1. Usually the corn crop gets about half its needed water from stored reserves and half from rainfall during the growing season. From June 1 to September 1, an inch of rain each week would be desirable. The likelihood of getting one inch or more of rain each week at Urbana is shown on back page.

Date	Percent	Monthly average rainfall (1931-1955)
May 1-15	30	4.2
15-31	35	
June 1-15	35	4.5
15-30	35	
July 1-15	30	3.3
15-31	25	
Aug. 1-15	25	3.2
15-31	25	

Note that corn that silks by mid-July is more likely to have enough moisture than corn that is two or three weeks later.

5. Early planting (if moisture is adequate for germination) will be an advantage if rainfall is short all summer; it will not be an advantage if the dry weather ends after early-planted corn has silked, but before later planted corn has reached this most critical period for water. Pre-emergence weed control is particularly important for corn planted very early.
6. Farmers who have not yet plowed for corn and thus still have a choice between plowing up a good stand of alfalfa or leaving the alfalfa another year and putting corn back on 1963 corn or soybean ground should consider that the supply of available moisture is greater in the corn stubble than under the alfalfa. Alfalfa continued to draw on subsoil moisture last fall long after corn and soybeans had been harvested.
7. On fall-plowed fields, try to get by with only one disking just before planting. Extra harrowing will dry the surface few inches more than no harrowing.

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crops and soils

ILLINOIS

April 20, 1964

No. 271

HOW WELL DO YOUR SOYBEANS GERMINATE THIS YEAR?

If you're not sure how well your soybean seed will germinate, it may pay you to have the seed tested. We're hearing frequent reports of seed lots that fall below par in germination. The situation appears most serious in southern and south-central Illinois.

Each year the Illinois Crop Improvement Association gathers seed samples from all over the state. This year they report that 44 percent of the samples from southern Illinois tested below 80 percent in germination. In the central part of the state, 12 percent of the samples were below 80 percent, while none of those from northern Illinois germinated below this level. Seed testers at the Illinois Department of Agriculture in Springfield are also finding more samples with low germination than at any other time in recent years.

Why are these beans low in germination? Probably the main cause was the severe drought that gripped southern Illinois late last summer. Soybeans ripening in the field dried down so rapidly that many were below 10 percent in moisture when they were harvested; some lots were as low as 7 1/2 to 8 percent. When beans are this dry, they are easily damaged by combining and subsequent handling. Many seeds split, but the splits may be cleaned out. In these low-germinating samples, damage is due to cracks in the seed coat. Many of the cracks are too small to see, but the cracked seeds are easy prey for disease organisms in the soil. They try to germinate, but rarely get through the soil surface before they're licked.

If you're planting beans in southern or south-central Illinois or buying seed from this area, be sure you know the germination. You can check it yourself or can have it tested free of charge by the State Seed Laboratory, State Fairgrounds, Springfield, Illinois. Your county extension farm adviser can give you further information on this service.

A full germination test is your best bet for determining the condition of soybean seeds. However, there is a quick check you can use to get a rough idea of how many cracked seed coats you have. Put the seed in cool, clear water for about two minutes. Then sort out the sound, hard seeds from the soft, puffy ones. Water seepage into the soft, puffy ones shows that they had cracks in their seed coats. A high proportion of cracked seed is warning that germination is probably low. Remember, though, this test gives only a rough idea. A full germination test is still your best bet.

What if your seed is low in germination--or contains too many cracked seeds? Well, you can always overplant, putting in enough seeds to be sure you get a stand. Or you can treat the seed with one of several chemical seed treatments on the market. With high-quality seed, treatment normally won't pay. But it

can often increase the percentage of beans that germinate, particularly if the seeds have seed-coat cracks. The chemical protects the seed from disease organisms in the soil until the young seedling is able to make it on its own. Several good compounds are available, but avoid those that contain mercury, since they can damage the seed through the cracks.

Plant pathologists suggest that such treatment may pay if your beans germinate below 75 percent. When treating beans, remember that federal laws allow no fungicide on seeds that may find their way into feed or food channels. So your best bet is a fungicide you can apply to the beans in the planter box.

Don't count on fungicides to revive dead seed--it can't be done. But they can help you by protecting weak seedlings until they can make it alone.

Without full, uniform stands, you won't harvest top yields. With soybeans you should try to end up with about eight healthy plants per foot of row. You can't count on such stands unless you know how your beans will germinate. If you're farming in southern or south-central Illinois, this is a good year to plant only germination-tested beans.

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AGRONOMY NEWS

crops and soils

April 30, 1964

PRE-EMERGENCE HERBICIDES FOR CORN - 1964

No. 272

Don't put a pre-emergence applicator on your planter just to be fashionable. Consider first whether it will pay. It is estimated that in 1964 Illinois farmers will apply pre-emergence herbicides on more than 25 percent of the state's corn acreage. Should more farmers be using these chemicals? Probably--but certainly not all farmers. If you are already doing a good job of controlling weeds with your rotary hoe and cultivators, then you may not need chemicals. But if you're not getting the control you'd like, pre-emergence weed-killers may pay off.

When choosing a pre-emergence herbicide, consider both your soil type and your weed problem. Randex has done well on the darker soils where annual grass weeds like foxtail are the main problem. Atrazine has done an exceptionally good job on lighter soils that are relatively low in organic matter. Atrazine often performs well on moderately dark soils too. But its effectiveness decreases as the organic matter increases, so you'll need to use more on the darker soils than on the lighter ones. On sandy soil it is the best chemical that is available.

If you are troubled with both grass and broad-leaved weeds, you have several choices. Atrazine controls both annual grasses and broad-leaved weeds. Or you can use Randex to control grass and then apply 2,4-D soon after the crop is up to control broad-leaved weeds. Another choice is Randex-T, a chemical similar to Randex but with the "T" material added to help control broad-leaved weeds.

2,4-D ester may also be used for pre-emergence weed control in corn. Although it costs less than other chemicals, it has not been so effective. However, if you're lucky and get rain within a few days after application, 2,4-D ester can control annual grasses as well as broad-leaved weeds.

Should you use spray or granules? In 1964 this answer is clear-cut once you decide which herbicide to use. This year atrazine will be available only as a wettable powder for spray applications. Randex and Randex-T are available in both liquid and granular forms, but most farmers prefer the granules, since they are less irritating to use. The liquid and granular forms of Randex and Randex-T are about equally effective for weed control. 2,4-D also is available as liquid and granules, and you can use either one.

You should also consider the possibility of chemical residues in your soil. Atrazine often provides spectacular season-long control of weeds. However, if part of it carries over into the next season, it may damage sensitive crops like oats or soybeans. To avoid such damage, use no more than the amount recommended for your soil type. And be sure to agitate it well in the spray tank. To play it safe, don't use atrazine the year before planting crops other than corn.

There have been a few cases in which Randex-T also carried over into the next season, damaging soybeans. But where the recommended rate is used, it's doubtful that the damage would be sufficient to lower yields. Randex and 2,4-D present no carry-over problem.

Corn has good tolerance to both atrazine and Radox. Its tolerance to Radox-T is not quite so good, but at recommended rates there is no problem. Corn is occasionally injured by 2,4-D, especially with heavy rains.

Knoxweed 42 is a new pre-emergence herbicide that now has label approval for corn. A combination of Eptam and 2,4-D controls both annual grasses and broad-leaved weeds. This year we suggest it for trial use only. It is less irritating than Radox or Radox-T and leaves less residue than atrazine. However, corn does not tolerate it so well as atrazine or Radox. Knoxweed 42 will be available only for spray application in 1964.

Eptam is available in both liquid and granular forms and is still suggested to control Johnsongrass from seed and wild cane.

Band Application of Pre-Emergence Herbicides for Corn

Herbicide	Amount of commercial product to apply per acre in 12- to 14-inch band	
	Liquid	Granular
Atrazine	5/6 to 1 1/4 lb.	Not available in 1964
Radox	1 1/3 qt.	7 lb. (20%)
Radox-T	1 1/2 qt.	10 lb. (35%)
2,4-D ester	1/2 lb.	3 1/3 lb. (20%)
Eptam	2/3 qt.	20 lb. (5%)
Knoxweed 42 (for trial use)	1 1/3 pt.	--

Liquid: For band spraying, use the indicated amount of herbicide in 7 to 10 gallons of water per acre (Note: The rate listed for 2,4-D represents the amount of active ingredient--acid equivalent--to apply.)

Granular: The amount listed is for the material, with the percent of active ingredient shown in parentheses.

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May 4, 1964

CONTROLLING WEEDS IN SOYBEANS--1964

No. 273

Early weed control pays off in soybeans. Control weeds during the first month after planting, and your soybeans will usually do the rest. Soybeans generally produce enough shade to keep most late-season weeds out of the rows.

Rotary hoeing is still one of the most effective methods of controlling early weeds in soybeans. You can kill weeds best with the rotary hoe after the weed seeds have germinated but before or very soon after the weeds emerge. Timely row cultivation can also effectively control weeds between rows and throw soil into the row to smother small weeds.

Where weeds are likely to be serious, pre-emergence herbicides--applied at planting time--are often a good investment.

Randex can do a good job of controlling grass weeds like giant foxtail. It has usually given better results on the darker soils that are relatively high in organic matter than on light-colored soils. Most farmers prefer to use it in granular form to help reduce irritation from the chemical. The granular and liquid forms are about equally effective. Soybeans are more tolerant of Randex than of any of the other pre-emergence materials.

The label now permits increasing the application rate from 4 to 5 pounds of active ingredient broadcast per acre. However, 4 pounds has done a good job on the darker soils, and this rate increase does not appear to be the answer to obtaining satisfactory control on the lighter soils.

Amiben has generally controlled both annual grass and broad-leaved weeds better than any other material for soybeans. In 1963 a few cases of damage to soybeans occurred, but in most of these cases it is doubtful that the early-season damage decreased yields. For 1964 the label instructions indicate that you can reduce the rate from 3 pounds active broadcast per acre to 2 pounds on most soils. The lower rate would reduce your cost and decrease the chance of injury. If you cultivate once or twice, the lower rate might be sufficient, but 2 1/2 to 3 pounds has given better control.

Alanap controls both annual grasses and broad-leaved weeds. Soybeans are sometimes injured, especially if heavy rains follow application. Since Alanap alone does not control smartweeds well, you may want to use a mixture of Alanap and IPC where smartweeds are a problem. Control of weeds other than smartweed and soybean tolerance have been about the same for the mixture as for Alanap alone.

Sodium PCP is available as a beaded material that you can apply dry with a granular applicator. Or you can dissolve the beads in water and apply the chemical as a spray. Sodium PCP has controlled broad-leaved weeds better than grasses. It performs better on light-colored soils than on the darker ones. The dust or spray is irritating and can cause sneezing.

Lorox is available only as a wettable powder for spray application. Although it has generally controlled weeds well, it may damage soybeans. You will need to adjust the rate according to soil type. Lorox will probably have greater potential for the light-colored soils than for the darker ones. For 1964, agronomists suggest only trial use on relatively small areas.

Treflan has received label approval for use on soybeans to be harvested only for seed. We need more research to find the best rates for our various soil types. We also need to know more about incorporation methods before suggesting use under Illinois conditions. Treflan has given good control of foxtail, barnyard grass, Johnsongrass seedlings, lambsquarter, pigweed, and smartweed, but it has not given good control of velvetleaf, jimsonweed, cocklebur, and ragweed.

Can you eliminate row cultivation by planting narrow-row soybeans and broadcasting a pre-emergence herbicide? Perhaps, but it probably wouldn't offer much economic advantage, since broadcasting--rather than banding--a pre-emergence herbicide would cost about \$10 to \$15 an acre. The extra cost could offset most of the yield advantage from narrow-row soybeans. It's best to space your rows so that you can still cultivate if the pre-emergence herbicide is not effective.

You can make a post-emergence application of 4-(2,4-DB) from 10 days before bloom to midbloom to control a serious cocklebur problem. Be sure not to exceed the recommended rate or you may injure the beans enough to reduce yields. Cockleburs are quite sensitive to this treatment, but you'll probably get little or no control of most other weeds. If the cockleburs are in patches, treat only the patches.

For additional information on weed control, ask your county extension adviser for a copy of U. of I. Circular 856, "Weed Control in Field Crops," and the 1964 supplement. These publications give a thorough rundown on chemicals, rates, and applications that have proved effective in Illinois trials and on Illinois farms.

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crops and soils

May 8, 1964

No. 274

WATCH OUT FOR SORGHUM ALMUM

Sorghum alnum, alias sorghum grass, is once again for sale in Illinois. You'll hear some mighty fancy claims for this crop. But here are some facts you should know before you plant sorghum alnum.

First, this crop results from a cross between sorghum and Johnsongrass. Its seed head is similar to that of Johnsongrass, and so is the seed. Like Johnsongrass, it forms rhizomes underground. Sorghum alnum rhizomes don't spread like those of Johnsongrass--but they spread enough to enable the plant to live over winter in many areas of Illinois. In fact, several advertisements for this grass boast that it can live over winter, acting as a perennial.

What's more, sorghum alnum crosses readily with Johnsongrass. If you grow sorghum alnum and have Johnsongrass in your field, fence rows, or nearby stream banks, you'll be producing your own hybrid seed--but it's a hybrid that's bound to cost you money. There's another danger here, too. States where sorghum alnum is harvested for seed also have infestations of Johnsongrass. Chances are that the seed you buy may already contain some crossed seed.

So sorghum alnum may present you with a serious weed problem--either on its own or by crossing with Johnsongrass.

Many states have already outlawed sorghum alnum, declaring it a noxious weed and its sale illegal within their boundaries. Our two neighbors, Indiana and Missouri, have taken this step. Other states include Arizona, Nevada, Washington, Massachusetts, Pennsylvania, Georgia, and California.

What can this grass do for you? Nearly everything, if you read the ads. But let's look at the test data. In trials in both New York and Nebraska, sorghum alnum fell below sudangrass and sudan-sorghum hybrids in yield. Several states have noted that sorghum alnum produces a stemmy plant that is drier and more woody than sudangrass. In several feeding trials, cattle apparently felt the same way--since they preferred other forages.

Sorghum alnum can also contain dangerously high levels of prussic acid. Sudan-grass and most sudan-sorghum hybrids contain low levels of this chemical, which is concentrated in new regrowth less than 18 inches tall. Sorghum alnum contains high levels. In recent Minnesota tests, sorghum alnum regrowth contained seven times as much prussic acid as Piper sudangrass. Minnesota workers state that "livestock poisoning is very likely" with sorghum alnum. Results from other states agree, showing the prussic acid potential to be too high for comfort.

Of course, you can put sorghum almum in the silo. Here the prussic acid breaks down and won't be a problem. But you'd be better off with corn silage--or even sudangrass.

This brings up another point: Don't confuse sorghum almum with the hybrid sudan-sorghum varieties now on the market. These hybrids offer no weed threat and will beat out their dangerous cousin in both yield and palatability. They'll also be considerably lower in prussic acid.

If you're looking for an annual grass, we suggest that you try sudan-sorghum or sudangrass. In trials at Illinois and in several other states, sudangrass and the sudan-sorghum hybrids have outperformed sorghum almum in both yield and feeding quality.

In fact, there's nothing that sorghum almum can do that sudan-sorghum and sudangrass can't do better--and without the risks. Your best bet--stay clear of sorghum almum!

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May 11, 1964

PIPER SUDANGRASS

No. 275

No doubt you've heard a lot this spring about sudan-sorghum hybrids. But in all the furor over them, don't forget Piper sudangrass, an old friend that's still doing a standout job. Sudan-sorghum hybrids can often yield more than sudangrass alone, but for many purposes Piper is as good as the hybrids, or even better.

For one thing Piper has more bounce-back under frequent cutting. In fact, in four of the past five years, it has outyielded the sudan-sorghum hybrids under four-cutting management at Urbana when all cuttings were made when the grasses were 30-inches tall. On the other hand, the hybrids were ahead under two-cutting management.

Cutting the sudan-sorghums higher, at, say, 6 inches above the ground, may help them resist the effects of frequent cutting. But at normal mowing height (about 3 inches) Piper has beaten them out under frequent-cutting systems.

Piper has a lower prussic acid poison potential than the hybrids. In fact, it should never present any problem because it was bred specifically for its low prussic acid potential. However, though the hybrids have a somewhat higher poison potential, we also do not expect them to present any problem in Illinois so long as they are properly managed.

Piper seed is more plentiful. This year seed of the sudan-sorghum hybrids is about sold out. If you are looking for an annual grass, Piper is probably the best that is available now.

Sow Piper at 20 to 30 pounds an acre. You can plant it as soon as the soil has warmed up enough to plant corn. We regularly plant in early May without any difficulty. It will start slowly and then take off when warm weather arrives. Or you can wait until June to sow Piper and still get good results.

It's probably best to drill the seed in 8-inch rows. Some farmers who use Piper for sheep pasture have drilled it in 16-inch rows. There's little difference in yield but a lot less waste with the 16-inch rows because the sheep can walk between the rows and not trample the forage. They will also keep down the weeds between the rows. But for hay or for cattle pasture, 8-inch rows are probably best, because weeds can be a problem with the wider spacings.

Fertilize Piper at about the same rates as corn, particularly if you are using phosphorus or potassium. For nitrogen, your best bet is to split the application, putting on 50 to 100 pounds of actual nitrogen at or before planting time and then topdressing another 50 pounds after the first cutting. If you're short on feed, you may want to topdress after later cuttings if your soil has plenty of moisture.

Piper and the sudan-sorghum hybrids can help fill summer feeding needs. Both can produce high tonnages of green chop or pasture during July, August, and September. However, neither measures up to corn silage or alfalfa hay or haylage for winter feed. Since they contain little or no grain, they rank well below corn silage in digestibility and energy. If you're feeding these grasses, you'll need to add considerably more grain to your winter ration. In trials in New York and Pennsylvania, sudangrass and sudan-sorghum hybrids both ranked about 56 to 58 percent in digestibility, while good corn silage tested over 68 percent. Calves fed sudan-sorghum silage at the Illinois Dixon Springs Experiment Station gained only half as fast as calves fed good corn silage.

And you'll need to feed protein supplement. Protein levels of both sudangrass and the hybrids are generally well below that of good alfalfa hay. Past results have usually shown them ranging from 9 to 12 percent in protein.

Early cutting can increase the protein level of all forages and would undoubtedly raise that of sudan and sudan-sorghum. But early cutting can also increase the protein content of alfalfa, and we've seen many many tests in which alfalfa ranked above 20 percent in crude protein, and in a few cases up to 25 percent.

Both sudan-sorghums and sudangrass can fill a place in summer feeding programs on Illinois farms. And if you've lost a seeding or need more winter feed in a hurry, they also make first-rate emergency forages. And though Piper sudangrass may be less glamorous than the hybrids, it still can do a first-rate job in Illinois.

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No. 276

May 28, 1964

HOW SOON SHOULD I CULTIVATE AFTER USING PRE-EMERGENCE HERBICIDES?

Pre-emergence herbicides can be quite effective, but they can also fail, especially when there is not enough rainfall to move them into your soil. Odds are normally about 3 to 1 that they will do a satisfactory job. However, this year a lack of rainfall in some areas of Illinois has many farmers scratching their heads and wondering "How soon should I cultivate?"

If the chemical is controlling weeds, there is generally no need to rush cultivation of the treated area. If the herbicide was banded over the row, cultivating too soon and too close to the row may throw new weed seeds into the treated area and decrease the benefits from the chemical.

On the other hand, if for some reason the herbicide is not killing weeds, don't wait too long before cultivating.

Suppose you used one of the more soluble pre-emergence herbicides, such as Randox or 2,4-D, at planting time. If it has not taken hold within two weeks and weeds are showing up, the chances are that the chemical is not going to work. In that case it is usually advisable to move in with a rotary hoe or shovel cultivator to get the early weeds.

If one of the chemicals with more residual, such as atrazine or amiben, has been used, weeds may sometimes begin to grow and then die, as the small weeds eventually pick up the chemical. But it's risky to wait too long, hoping that such chemicals will take hold, because they may not. With these longer lasting chemicals you can go ahead and clean up the first crop or weeds with the rotary hoe or row cultivator and probably still get some benefit from the chemical on later weeds.

In two years of research at the University of Illinois to determine the effect of the rotary hoe on the action of pre-emergence herbicides, rotary hoeing about two weeks after planting did not appear to have much effect, good or bad, on most of the chemicals that were used.

Will your investment be a total loss if you use the shovel cultivator to get at the first crop of weeds? Not necessarily. A chemical with some residual activity, such as atrazine, may remain to help control later weeds even though it did not work on the first crop of weeds. It is true that new weed seeds will be thrown on top of the chemical band, but some benefit may still be possible as these weed seeds germinate and the roots of the weeds reach the chemical.

Here are the main points to remember: If it is too wet to cultivate and the chemical is doing a good job of controlling the weeds, be thankful that you used it. If the chemical is not working, weeds are growing, and it is dry enough to cultivate, it's best not to sit around waiting for miracles.

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AGRONOMY NEWS

crops and soils

June 8, 1964

CONTROL FENCEROW WEEDS EASILY

No. 277

If you're looking for an easy way to control weeds in your fencerows, try spraying. Farmers who have tried it are enthusiastic about the results. It will keep fencerow weeds from spreading to your fields. And it will keep your fencerows looking neat. Spraying surely beats struggling with a mower on a hot July day. It will also do a better job of keeping down regrowth and weed seed production.

Here's a good spray program:

Put 50 gallons of water in your spray tank.

Add 5 pounds of Dowpon--just as it comes from the container.

Add 1 pound of 2,4-D. If you're using 2,4-D with 4 pounds of chemical per gallon, one quart will contain 1 pound of 2,4-D. This amount will give you enough spray to cover an acre of fencerow. That's about the same as 2 miles of fencerow 4 feet wide--or one time around 160 acres.

If there are any susceptible crops or plants in the vicinity, it would be safer to use the amine than the ester form. Use a nozzle that will apply a fairly coarse spray. Some farmers use a regular garden hose nozzle. To help prevent drift, spray on a day when there is little or no wind. Dowpon and the amine form of 2,4-D don't volatilize like 2,4-D ester, so there isn't so much danger to nearby plants unless the spray is too fine and the particles drift to susceptible plants.

The smaller the weeds, the easier they are to kill. June is usually the best time. If some regrowth occurs, you may want to spray again later in the summer.

Dowpon controls grasses, and the 2,4-D controls broadleaved weeds. You can adjust the amounts of material given above to fit your specific situation. If the grasses are mostly annuals--like foxtail--and they are only 2 or 3 inches high, then 2 or 3 pounds of Dowpon should be enough. Lowering the rate should also reduce damage to desirable perennial grasses like bluegrass or brome grass.

If you have perennial grasses like Johnson grass in the fencerow, you may want to increase the amount of Dowpon to about 10 pounds per acre.

If broadleaved weeds are your main problem, you could use 2,4-D alone without Dowpon. One pound of 2,4-D per acre should kill most broadleaved weeds without killing desirable grasses. Remember, the smaller the weeds, the easier they are to kill. If you have Canada thistles in your fencerow that 2,4-D won't control, you can spot-treat them with amitrole or amitrole-T.

Don't let your livestock graze fencerows treated with Dowpon, amitrole, or amitrole-T. Although 2,4-D is not highly toxic, it makes some poisonous plants more palatable, so take precautions in using it. Refer to product labels for more specific information on handling these herbicides and precautions to take with them.

Soil sterilants, such as chlorate mixtures or high rates of atrazine, are sometimes used in fencerows to kill the vegetation for a longer time. But permanent sterilization may leave the ground bare and subject to erosion. It also destroys wildlife cover. Most farmers prefer temporary treatment that will allow desirable vegetation to grow again in the fencerow.

In warm, moist weather, Dowpon and 2,4-D usually decompose well enough in four to six weeks to allow grasses to grow. In some cases you may want to seed a desirable grass, such as brome grass, in the fencerow. A good competitive grass stand will help to keep out annual grasses and broadleaved weeds.

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AGRONOMY NEWS

crops and soils

June 19, 1964

GET POISON IVY BEFORE IT GETS YOU

No. 278

Once the best way to handle poison ivy was to leave it alone. But that isn't always possible. Youngsters have a way of getting into poison ivy, and more than one farmer has found himself scratching after mending his fences or clearing brush.

But times change. With the modern weed killers, now the best way to handle poison ivy is to kill it.

Identification. First, be sure that you can recognize this pest. Poison ivy can vary greatly both in growth habit and in leaf appearance. It can spread along the ground; grow as a vine on fences, walls, and trees; and even grow as a shrub.

The giveaway is the leaves. Three leaflets make up each leaf. They are usually shiny, but they may also be a dull green. The leaflet edges may be smooth, toothed, or lobed. You may even find all of these variations in the same plant.

The poison. The skin irritant in poison ivy is in the sap of the roots, stems, leaves, and berries. Some people are apparently more immune to it than others. But don't push your luck. People who consider themselves immune may become susceptible after sufficient exposure.

The poison is potent and can cause severe inflammation. It's easily transferred from one object to another. It can get on your clothes, garden tools, and even your pets and then rub off on you or members of your family. The poison is volatile and can even be carried in the smoke from burning poison ivy plants.

Control. Modern weed-killing chemicals--herbicides--offer the easiest and safest method of controlling poison ivy. The herbicides mentioned here, when handled properly, will do an effective job. But don't allow them to contact desirable plants. To avoid drift to desirable plants, spray on a quiet day when there is no wind. In all cases, read and follow directions on the container labels.

Amitrole (3-amino-1,2,4-triazole) is most effective for killing poison ivy. You may find it under such trade names as Amino Triazole, Weedazol, and Poison Ivy Killer. Aerosol cans containing amitrole are a convenient way to treat small patches.

For treating with a small hand sprayer, mix 3 level tablespoons of the commercial preparation containing 50 percent amitrole with one gallon of water. For large areas, mix one pound of the 50 percent material in 25 gallons of water.

You can apply amitrole from the time the plants make their early spring growth and the leaves reach full size until they begin to change color in the fall. Thoroughly wet the entire plant with the spray, but do not let it contact desirable plants. If there's a chance that you will damage desirable plants by spraying, apply amitrole to ivy leaves with a long-handled brush.

Brush killer is the name commonly applied to mixtures of 2,4-D and 2,4,5-T. The mixture kills poison ivy more effectively than 2,4-D alone. Brush killer will also kill other undesirable woody plants where the two grow together. Most grasses tolerate 2,4-D and 2,4,5-T better than amitrole. However, 2,4-D and 2,4,5-T increase the danger from drifting vapor to desirable broad-leaved plants in the area.

Apply brush killer when the plants reach the full-leaf stage in the late spring or early summer. If regrowth occurs, repeat the treatment. If a sprayer has been used for brush killer, do not use it for spraying ornamentals or sensitive crops.

How to Mix Brush Killer Sprays

<u>To this many gallons of water</u>	<u>Add this much brush killer*</u>
1	2 tablespoons
3	6 tablespoons
25	1 1/2 pints
100	3 quarts

(*For brush killer containing 4 pounds of acid equivalent per gallon.)

Poison ivy can make both you and your family miserable. Be sure you know how to identify it. Then, whenever you can, kill it the chemical way.

If you would like more detailed information on poison ivy identification and control, ask your county farm adviser for a copy of Illinois Circular 850, "Controlling Poison Ivy."

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AGRONOMY NEWS

crops and soils

July 20, 1964

No. 279

FLOWER-DROP IN SOYBEANS--IT'S NORMAL

If you are watching your soybean plants closely these days, you may see that a great many flowers have dropped off. Although this drop may look frightening, it's actually nothing to worry about; it is only normal.

The soybean plant produces flowers over a long period--four to six weeks. During this time it produces far more than could possibly set seed. The extent of flower shed depends on water, light, fertility, and other environmental factors.

Any factor that favors soybean growth will increase pod set. Likewise, any factor that restricts soybean growth will decrease pod set--and increase blossom drop.

How many flowers normally drop? Anywhere from one-fourth to three-fourths. Two-thirds is a common loss of blooms. This many flowers can drop without hurting production. For instance, flower drop was heavy last year over much of Illinois, and yet we had bumper crops and an all-time record yield of 29.5 bushels per acre for the state.

The remarkable soybean plant has other built-in yield buffers. For instance, let's suppose that growing conditions are good during flowering--so that flower drop is small--and then the weather turns hot and dry. This change triggers self-correcting growth regulators in the plant, and the plant gets rid of the pods that it cannot fill.

If dry weather hits still later, after the pod number is fixed, then the seeds will be small.

Now let's take another case: Adverse weather at flowering time causes a great deal of blossom drop. But let's suppose the weather improves and late-season conditions are optimum for soybean growth. In this case the plants will respond by producing larger seeds--and good yields.

Growth regulators in the soybean plant also help in another way. Often grasshoppers or other insects eat the blooms as they appear. If growing conditions are right, the plants will continue to produce flowers long past their normal period--until they finally succeed in setting some pods.

Many researchers, past and present, have attempted to use growth-regulating chemicals to hold a higher percentage of blooms--sometimes with some success. But rarely has this process increased yields. More studies are now in progress that may suggest some leads for the future.

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AGRONOMY NEWS

crops and soils

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July 24, 1964

No. 280

NOW'S THE TIME TO IMPROVE PASTURES

Could you use more feed from your permanent pastures? The chances are that you can increase your pasture yields by establishing a new high-yielding grass-legume mixture. Often you can double--even triple--the number of animals your pasture acres can carry. August is a good month to do this job.

There's nothing magic about pasture renovation. It just takes five steps, each building on the last one. Here are some suggestions that you may find helpful:

1. Test your soil; then fertilize accordingly. This procedure is profitable for most crops, but it's a must for permanent pastures. Most of these are low in fertility. Many cover up worn-out cropland; others have suffered from many years of heavy grazing. Lime is likely to be low in most areas of Illinois. Phosphorus and potassium are usually short as well.
2. Kill the competition. Plowing is best; it buries weeds and grasses and other plants that might fight your seeding. It also mixes the fertilizer with the soil and prepares the seedbed. Heavy disking may do the job on land that is hard to plow, but it's risky. Many renovated pastures are hurt or lost through competition from unkilld weeds and grasses.
3. Plant a good legume and grass pasture mixture. If your drainage is good, choose alfalfa as your legume. Where this crop will grow, it will out-yield all other perennial forages. Red clover and alsike can help out in the first year or in wet spots. Ladino is a good addition to your mixture on fields that get plenty of moisture. Lespedeza can help out in mixtures for southern Illinois.

Orchardgrass is a vigorous grass that fits well in pastures anywhere in Illinois. Its strong point is its good summer growth; its weakness is the early maturity of the first growth.

Smooth brome grass makes a good pasture grass for northern and central Illinois. It resists dry weather better than orchardgrass and fits better on drouthy soils. Tall fescue fills the southern Illinois need for pasture in the fall, winter, and spring. But fescue is a tough competitor for legumes and can crowd them out.

When seeding in late summer, roll the seedbed after broadcasting your seed. Rolling helps firm the soil around the seed, giving it better access to moisture and a better chance to germinate. Corrugated rollers are best, but any roller will help.

4. Control grazing. Let the seeding establish itself. Many good seedings are lost every year through overgrazing in the fall. Keep the animals off summer seedings. Graze spring seedings lightly.
5. Maintain a high pasture yield. Clipping weeds and mature growth helps to keep quality high. You can use 2,4-D on grass to kill ragweed, dandelion, and buckhorn. But 2,4-D also kills legumes, so use it only on grass.

Maintain soil fertility. Animal droppings help, but they're poorly distributed. Legumes continue to need phosphorus and potassium. Grasses need nitrogen and a little P and K. Rates will depend on your soil. If the stand is over 30 percent legume, use phosphorus and potassium. If less than 30 percent legume (over 70 percent grass), use nitrogen to get a yield increase.

If your permanent pasture isn't paying its way, renovation can put it on its feet. It's a long-term investment that's paying off on many Illinois farms.

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AGRONOMY NEWS

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August 21, 1964

TIPS FOR SUMMER FORAGE SEEDINGS

No. 281

Are you planning to make a late summer forage seeding this year? Late summer seedings have several advantages: (1) You avoid competition from a small-grain companion crop. (2) Weeds provide less competition for forage plants. And (3) once plants are well established, they can go on to produce top yields the following year.

There are disadvantages too: Lack of moisture can be a real problem, particularly this year in southern Illinois. Also, late summer seeding favors the grasses in the mixture. Grasses grow faster than legumes in cool weather. They will be tough competitors during the fall months.

You can overcome some of these disadvantages. One way is by paying particular attention to your planting date. For best results, seed by September 1 in northern Illinois and by September 15 in the southern part of the state. Keep the seed in the top half inch of the soil, and roll the field after planting. If you don't usually roll your forage seeding, try it and leave a strip through the field unrolled. Unless moisture conditions are ideal, you will see the difference.

Also, you should test your soil before seeding alfalfa. If the pH level is below 6.0, alfalfa plants may start growing but they won't survive. If the pH is below 6.2, alfalfa will not yield well. Many soils in Illinois test below 6.0, and some go below 5.0. Add lime if your soil tests below 6.2.



Cody, a new high-yielding alfalfa variety that is well adapted to southern Illinois, features resistance to the spotted alfalfa aphid.

On some soils you'll need to supply phosphorus. On others you'll need potassium. For most profitable results, apply amounts called for by your soil test.

Vigorous new alfalfa varieties boost chances for a good legume stand. They become established faster than older varieties and compete better with the grass during the fall. And they will give you more tons of forage per acre the following year.

There are two types of alfalfa varieties: (1) fast-growing varieties like DuPuits, Alfa, and FD-100 for short-term stands and (2) wilt-resistant varieties like Vernal, Buffalo, Cody, and Ranger for short or long rotations.

Which ones are best suited to your farm? It will depend on how you use alfalfa. DuPuits and Alfa will give you outstanding production if you leave alfalfa down only one or two years and are equipped to harvest before June 1 (May 20 in southern Illinois). Vernal, Buffalo, and Cody are better bets if you can't harvest that early. They mature after DuPuits and Alfa and tend to be less stemmy when you must delay harvest into June.

Cody, Buffalo, and Vernal are resistant to the bacterial wilt disease that kills susceptible alfalfas in the third harvest year. Therefore, they are well adapted for long-term stands. Cody also has resistance to the spotted alfalfa aphid, a western pest that has moved into some areas of southern Illinois during the past two years. Cody is therefore an excellent variety choice for southern Illinois farmers this year.

Ranger, a long-time standard, can no longer keep pace with these superior newcomers. In trials, DuPuits and Alfa consistently outyield Ranger by more than a ton per acre per year. Vernal outyields Ranger by more than half a ton per acre per year and is more resistant to leaf diseases.

If you plant a large acreage, you may have a place for both early- and late-maturing types. DuPuits, Alfa, or FD-100 will give you top yields for early harvest, while the later maturing Vernal, Cody, or Buffalo can help you spread your harvest season.

You may pay \$1 to \$2 more per acre to seed one of these new varieties. But you can increase your forage yields by one-half to one ton of dry hay per acre per year. Where else can you get a bigger return on your investment?

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August 18, 1964

No. 282

VIRUS DISEASE FOUND IN SOUTHERN ILLINOIS



Dr. M. C. Shurtleff inspects virus-infected plant. Note stunted stalks and presence of Johnsongrass.

A potentially dangerous disease of corn has invaded several counties in southern Illinois. Caused by a virus, it closely resembles but is apparently not corn stunt, a disease common to central America and the southwestern states of the U. S., and lately discovered in Mississippi, Louisiana, and other Gulf states.

This new disease can wipe out an entire corn crop--and has done so in several fields in southernmost Illinois. In other fields in that area it has affected only isolated plants--but it may well become more serious in future years.

Infected fields show these symptoms: At first, faint yellowish stripes appear in the younger leaves, together with a shortening of the uppermost internodes of the stem. This shortening causes the plant to appear bunched at the top. As growth continues, the yellowing may increase in extent and intensity. Newly formed internodes show pronounced shortening, making the height only one-third to one-half that of healthy plants. The upper leaves of many, but not

all, hybrids turn a brilliant purple-red. Diseased plants commonly develop "extra" ears that are smaller than normal ears and bear little or no seed. As the season progresses, stunted plants gradually die. The top leaves turn brown first. Drought accelerates the death rate.

Of course, many factors besides disease cause plants to be short or stunted. This year dry weather has caused a great deal of short corn in southern Illinois, particularly on droughty fields or parts of fields. Low fertility can have the same effect. So can weeds, or competition from nearby trees. Aphids working in the tassels also can cause stunting, and these insects are common in many Illinois fields.

This disease--though similar to corn stunt in its symptoms--differs in several important characteristics: True corn stunt is transmitted by only two species of leafhoppers (both unknown in Illinois) and infects only corn and a wild relative of corn called teosinte.

But the disease now present in southern Illinois apparently does not need an insect carrier. It can be transmitted mechanically (by grinding infected corn tissue and rubbing it on healthy corn leaves with carborundum). And it can infect not only corn, but sorghum, Johnsongrass, yellow foxtail, crabgrass, and other wild grasses. True stunt takes at least 26 to 30 days to develop after infection takes place. But this mechanically transmitted virus can cause symptoms to appear in five days.

This disease is apparently new, having been discovered in southern Ohio and Indiana only within the past two years. This year it has spread in those states and has also been located in Illinois, Kentucky, and Missouri.

We still have a great deal to learn about this disease. Information is limited on many facets of its spread and development. Several points are known, however:

First, it appears to be generally associated with Johnsongrass. It shows up first on bottomland fields, but can move to uplands. So far in Illinois, all infestations have been found in river or creek bottoms in or near fields where Johnsongrass is present. The connection with Johnsongrass is not clear, but this grass may be acting as an alternate host for the disease.

USDA and state experiment station workers and major seed corn companies are currently screening breeding lines and hybrids for possible resistance to this disease. Trials are already in progress in areas of Ohio and Indiana known to be infested in 1963. Preliminary observations suggest that several lines may possess at least some tolerance. More information on possible sources of resistance (or tolerance) will be available when this year's results are summarized. This approach appears to offer the best long-run promise for controlling this disease.

University of Illinois agronomists and plant pathologists have joined with researchers in other states and with the USDA to launch an intensive program to study this disease, its cause, and its method of transmission and to determine methods for controlling its spread. These studies will provide the basis for recommendations concerning the 1965 and future corn crops.

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AGRONOMY NEWS

crops and soils

September 1, 1964

COME TO AGRONOMY DAY - SEPTEMBER 10

No. 283

Once again it's time for Agronomy Day at Urbana. We're busy organizing the program right now. We hope you'll come and visit us on September 10.

Here on the Agronomy South Farm you'll see the latest in profit-making crop production practices. You'll learn new facts about your soil. You'll also hear some startling new ideas that may lead to the break-throughs of the future.

On the South Farm, tours will leave continuously through the morning, starting at 9:00 a.m. Lunch and refreshments will be available. In case of rain, we'll hold the program in the Stock Pavilion, so come anyway.

Program highlights will include the following:

1. Will narrow-row corn pay? Dr. Johnny Pendleton has one of the most complete tests ever on row widths and planting patterns. You'll see his plots and hear his ideas.
2. Do starter fertilizers pay? And how about micronutrients? Al Lang will discuss yield data and show you side-by-side test plot comparisons.
3. Why don't soybean yields go up faster? Drs. Bob Howell and Ray Johnson will discuss factors that limit soybean yield increases.
4. Trained agronomists are in high demand. Agricultural businesses offer our graduates good jobs in research, service, and sales. Dr. M. D. Thorne, head of the U. of I. Department of Agronomy, points out the big opportunities for young men as agronomists in agriculture.
5. Have you heard about those sorghum-sudangrass hybrids? Drs. Tom Burger and Carl Hittle have a wide-ranging test covering varieties, cutting heights, and overall management. If you're interested in this crop, you'll gain valuable information here.
6. What's the latest on wheat varieties and fertilization? Wheat breeder Roland Weibel will discuss the latest results and show harvest samples. Area agronomist Les Boone will also discuss fertilizer trial results.
7. Corn leaf blight has had it. The University of Illinois team of corn breeders and plant pathologists have developed genetic resistance and released the sources to all interested hybrid corn companies for use in developing their hybrids. See how this resistance works and how it can help your corn crop.

8. What's new in weed control? Drs. Ellery Knake and Fred Slife will bring you up to date on the latest in weed-killing chemicals and practices.
9. Diseases cut soybean yields every year. Plant pathologist Don Chamberlain will tell you what's being done to beat diseases.
10. How about hybrid soybeans? Dr. Henry Hadley will discuss his search for male sterility--the first step on the way.
11. Can we increase the energy content of corn? Dr. D. E. Alexander says higher oil content will do just this, and he has some ingenious tools to help in the breeding process.
12. What's new in soybean varieties? You'll see the new "63" varieties growing side by side with their namesakes. And you'll see Wayne, a high-yielding newcomer that shows great promise.
13. What's your soil made of? Drs. Al Beavers and Bob Jones will give you a worm's-eye view of how fertilizer reacts (or fails to react) in your soil.
14. New alfalfa varieties are on the way. Dr. Joe Jackobs and Dave Gilchrist will show you side-by-side comparisons of varieties you'll find on sale next season.
15. And, last but not least, you'll have a chance to compare commercial corn hybrids side by side in a large variety demonstration.

And you're also invited to visit the historic Morrow Plots. Starting at 1 p.m. Larry Miller will be present to answer questions and describe research work in progress.

So that's the program. We hope you'll come and bring a carful with you. Chances are you'll meet old friends, maybe even make some new ones. We're looking forward to visiting with you. See you September 10.

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AGRONOMY NEWS

crops and soils

IA, ILLINOIS

September 2, 1964

1964 WHEAT VARIETY YIELDS

No. 284

What's in a name? A great deal, if you're talking about wheat varieties. Each variety has its own personality and does some things well and some others not so well. For top production you want a variety that resists diseases and insects and that stands well. Most of all, you want one that has a dependable potential for high yield.

University of Illinois wheat breeder Roland Weibel carries on a wide-range testing program to measure yield potential in various parts of the state. He reports the following yield data from these trials. We have broken them into two groups. The first (see table below) includes test sites in the northern and central parts of the state, where farmers normally grow hard or bearded wheat. The second (see table on back) covers southern and south-central Illinois, which grow mainly soft wheat.

Results of Tests in Hard Wheat Areas

	Urbana	DeKalb	Elwood	Carlinville	Average
<u>Hard wheat</u>					
Ottawa	51	53	45	71	55
Gage	55	48	47	73	58
Triumph	46	54	38	64	51
Pawnee	47	52	48	68	54
Ponca	50	46	41	56	48
Omaha	48	48	40	62	49
<u>Soft wheat</u>					
Monon	52	50	45	76	58
Knox	52	48	45	71	54
Knox 62	52	51	47	69	55
Vermillion	51	50	53	79	58
Redcoat	55	53	54	75	56
Reed	48	44	51	63	52

Note that, on the average, Ottawa and Gage lead the hard wheats. For 1964, Ottawa should be first choice in this class. It not only yields slightly more than Pawnee, but has a stiffer straw and better resistance to rust, soil-borne mosaic, and Hessian fly. Gage shows promise, but seed supplies are extremely limited. More seed should be available for planting in 1965.

Monon and Vermillion head the soft wheats. But note that their yields differ little from those of the best hard wheat varieties. Since hard wheat generally sells for 10 to 15 cents more per bushel, hard wheats will generally be more profitable throughout northern and north-central Illinois.

However, soft wheats do comparatively better than hard wheats in southern and south-central Illinois. The table below gives yields from four locations in this area.

Results of Tests in Soft Wheat Areas

	Brownstown	Newton	Toledo	Dixon Springs	Average
<u>Hard wheat</u>					
Ottawa	34	40	30	52	39
Gage	31	43	31	49	38
Triumph	37	37	49	52	43
Pawnee	33	39	37	37	37
Ponca	32	40	31	43	36
Omaha	34	38	34	41	37
<u>Soft wheat</u>					
Monon	47	54	61	55	54
Knox	38	48	60	50	47
Knox 62	48	49	60	50	52
Vermillion	39	48	58	44	47
Redcoat	38	43	--	47	46
Reed	42	47	54	43	49

Note that Monon, Knox 62, Vermillion, and Reed lead the pack in yield. The hard wheats fall far behind. Farmers in this area can make more profit by growing soft wheat despite the price differential--simply because soft wheats do better than hard wheat varieties in southern Illinois.

Monon shows the standout performance that has made it popular among Illinois soft wheats. Among the hard wheats only Triumph does at all well, and that is because of its earliness, which allows it to beat the heat.

Choosing the right variety for your farm is important. But so is good seed. A recent survey showed that one-third of the wheat seed sown by Illinois farmers was unfit for planting. Germination was low or weed seed high. Sometimes the seed was not even the variety that had been advertised.

You can be sure of getting high-quality seed. Your best bet is to buy certified seed from a dealer who takes pride in the quality of his seed. Good seed doesn't cost--it pays.

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AGRONOMY NEWS

crops and soils

October 9, 1964

FALL VS. SPRING PLOWING

No. 285

For the past two years, Illinois weather has been ideal for fall plowing--and fall-plowed acreage has increased. This year soybean and corn harvests are again ahead of the normal dates. The chances therefore are that you'll be tempted to do your plowing this fall.

Should you plow your land this fall, or should you wait for spring? The answer depends on your soil type, the slope of your land, your available time, and the weather. Here are several guidelines:

First, don't expect an increase in yields from fall plowing. In a trial at Urbana last year, U. of I. agricultural engineer H. P. Bateman found no yield advantage for fall plowing over spring plowing. He compared both corn after corn and corn after alfalfa grown on a Drummer silty clay loam. Iowa researchers also compared fall vs. spring plowing. Their tests, conducted on a dark brown prairie soil, ran for several years and involved two rotations: corn-oats and corn-oats with a sweet clover catch crop seeded in the oats. Their results showed a slight increase for fall plowing, but only in one year was it significantly better.

A fall-plowed catch crop or meadow can occasionally show a yield advantage when spring moisture is low. But in the long run it will probably pay to leave most legumes (not sweet clover) on the land as long as possible in the spring to take maximum advantage of their nitrogen-supplying powers. If you plow legumes in the fall, plow as late as possible--when soil temperatures are low--to prevent rapid breakdown of plant tissue and thus help to reduce nitrification and loss of nitrates through leaching.

The chances are that fall plowing will do one thing for you. It can help you spread out your labor load. Getting the job out of the way in the fall often lets you plant earlier the following spring. In some years early-planted corn shows a yield advantage--not due to fall plowing, but due to early planting made possible by fall plowing.

Often your decision will depend on your soil. For instance, on poorly drained soils that have a high clay and organic matter content, fall plowing is almost a must. In most years these soils are wet for so long in the spring that spring plowing can cause "puddling." As a result, the seedbed will be poor or several disking operations will be needed. Such soils--at least those with a fairly high organic content--are easily tilled the next spring after fall plowing, since the alternate freezing and thawing causes a granulating action that breaks up the clods.

The same thing is not true, however, for poorly drained soils that are low in organic matter. Here freezing and thawing after fall plowing may break up the soil granules to the point where you will need to plow again the next spring. Fortunately, most Illinois soils do not fall into either one of these categories.

If your land includes some of the better drained Illinois soils, before you fall-plow consider the amount of erosion you're likely to get from rain, melting snow, or wind. Fall plowing is risky on slopes greater than 2 percent, particularly on long slopes of 200 feet or more. On contour-plowed or terraced land, you could fall-plow slightly steeper slopes. But remember that fall-plowing deep prairie soil with a 3 percent slope can easily increase soil losses by as much as one ton per acre unless you compensate by using adequate conservation practices.

And here's a tip: Leave all of your fall-plowed ground as rough as possible to help prevent water from running off and let it soak into the soil. Leaving the land rough will also reduce wind erosion--a real threat in some years. In the spring one disking or cultivation to kill weeds just before planting is all the tillage you'll need for making a good seedbed on most fall-plowed ground.

In Illinois, most wind erosion comes from southwestern winds in April and early May during dry springs. You can reduce wind erosion and thus cut soil losses from one-fifth to one-half by leaving a buffer strip of unplowed land three or four rows wide at 80- to 160-foot intervals.

Soil type and slope are the keys to whether to plow in the fall or spring. If you're in doubt, check with your county farm adviser about your soil type and its characteristics. Then make your decision.

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crops and soils

October 12, 1964

No. 286

PASTURING SORGHUM-SUDANGRASS HYBRIDS AFTER FROST

You can graze sorghum-sudangrass hybrids after frost. Or you can harvest them for other uses. Here are some tips that may help you use this forage safely.

Your main risk in grazing frosted sorghum-sudangrass is from regrowth from the base of frost-nipped plants. Like summer regrowth, these new shoots can be high in dhurrin, a chemical that converts to poison in the rumen of cattle or sheep.

But this prussic acid precursor is diluted as these shoots develop, and by the time the regrowth is 18 inches tall the forage will be safe to graze or feed.

There's no reason to pull your animals out of a sorghum-sudangrass pasture just because of a frost. Freezing does not cause any appreciable buildup in prussic acid--or any other toxic substance. But, if warm weather follows and regrowth begins, then it's time to move your cattle to another pasture. Otherwise they'll pick out the succulent new shoots, leaving the drier material that was killed by frost. By filling up on this short material, they might get enough prussic acid to be harmful.

But even if you have such regrowth, you may still be able to use this feed. You can chop it for green chop or silage. Or you may be able to cut it for hay. In each of these operations, you'll mix the regrowth with the taller material and so dilute the prussic acid potential, making the forage safe to feed.

Now let's suppose you had clipped your pasture, and regrowth over the whole field was only 12 inches tall when frost occurred. This material may have had a high prussic acid content at frost time, so it would be best to keep cattle off for about three weeks. By that time the forage will be safe to graze--so long as no regrowth has occurred. During this period the frosted plants will dry out, and the prussic acid precursor will break down and dissipate.

If you're concerned about the regrowth, there's still another possibility: Just wait until cold weather sets in and all material has been dead for three weeks. The prussic acid potential will break down and dissipate as the plant material dries.

So you can make use of frosted sorghum-sudangrass. Prussic acid poisoning rarely occurs in Illinois. We know of no confirmed cases within the past few years. Just be cautious about new growth less than 18 inches tall, and you should have no prussic acid poisoning with sorghum-sudangrass forage, whether it is frosted or not.

Save your Agronomy News. Each issue is punched to fit into a loose-leaf notebook. You'll soon compile a year-round file of profit-making tips. Many farmers tell us that by saving back issues they always have a ready reference on crop production practices at their fingertips.

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November 25, 1964

NEW VARIETIES TOP ILLINOIS OAT TRIALS

No. 287

Three new varieties, Brave, Garland, and Clintland 64, shared top honors with the high-producing Shield in 1964 University of Illinois oat trials. Dr. C. M. Brown, U. of I. oat breeder, carried on these tests as part of his program aimed at bringing the best possible varieties to Illinois oat growers. The table below gives 1964 results as well as four-year average yields. Note that Garland and Shield were the top varieties in trials at the Northern Illinois Research Center in DeKalb County. These two varieties seem to make test-topping a habit in northern Illinois. Shield has an outstanding yield record both in test plots and in farmers' fields. Garland, a newcomer, appears to yield just as well and has better straw strength and rust resistance. Other top varieties running close behind these two include the old faithful Newton as well as Brave and Clintland 64, two new varieties just out of the breeding nurseries.

Oat Variety Drill Yields, 1961-64, as Reported by
Dr. C. M. Brown, U. of I. Oat Breeder

Variety	DeKalb		Urbana		Brownstown	
	1964	1961-64	1964	1961-64	1964	1961-64
(bushels per acre)						
Putnam 61	94	--	77	80	50	67
Bonkee	98	--	78	--	52	--
Nemaha	88	91	77	81	45	57
Minhafer	99	98	79	82	40	58
Neal	89	--	89	--	49	--
Shield	105	110	94	86	46	63
Brave	98	104	93	90	54	70
Newton	101	100	89	88	47	64
Clintland	84	94	90	83	47	59
Clintland 60	84	97	90	85	47	59
Clintland 64	98	--	89	--	50	--
Pippecanoe	94	--	87	--	43	--
Woodfield	92	94	79	78	40	56
Garland	104	105	91	88	48	--
Coachman	93	--	91	--	--	--
Average	95	99	87	84	47	61

At Urbana, in central Illinois, Brave is well ahead of other varieties in its four-year average. In 1964 Shield was outstanding, but Brave, Garland, and Clintland 64 also performed well.

In south-central Illinois, at the Brownstown Research Center in Fayette County, Brave led all varieties, with Clintland 64 and the early Putnam 61 close behind. Brave, a new variety developed by Dr. C. M. Brown, performed particularly well in central and south-central Illinois and shows great promise for these areas. It also held its own in northern Illinois and should find a place there. In addition to high yield capacity, Brave has excellent rust resistance. Its straw strength is adequate, but not equal to that of Goodfield or Garland. Brave's strongest feature may well be its ability to resist yellow dwarf virus, the disease that devastated Illinois oat yields in 1959. Foundation seed will be released to certified seed growers next spring.

Also encouraging was the performance of Clintland 64, the newest version of the fine series of Indiana varieties that has included Clintland and Clintland 60. Clintland 64, released this year, has better rust resistance than its predecessors. Its strong performance at all three test sites suggests that it should have a fine future in Illinois.

Several special-purpose varieties also did well at one or more test sites. They included the stiff-strawed Goodfield (designed for fields where lodging is often a problem) and Putnam 61, a week earlier than Newton in maturity and well suited for oat growers seeking an earlier variety.

Newton, a dependable old-timer, showed that it can still hold its own in yield trials. Several of the new varieties may yield a few bushels more and have a little better disease resistance, but Newton is still a fine oat variety in Illinois.

These new varieties will all bear watching. In Brave, Garland, and Clintland 64, we are seeing a new generation of oat varieties. Each has outstanding yield capacity combined with excellent disease resistance. The chances are that you'll see a great deal more of these varieties in the years to come.

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AGRONOMY NEWS

crops and soils

December 18, 1964

MERRY CHRISTMAS AND HAPPY NEW YEAR
FROM THE AGRONOMY EXTENSION STAFF

No. 288



Standing, left to right: Roland Weibel, Fred Welch, Tom Hinesly, and Bill Pardee. Seated, left to right: Ed Runge, W. O. Scott, Ted Peck, and Ellery Knake. Foreground: Marlowe Thorne, head of Department of Agronomy.

We've enjoyed serving and working with you during the past year. We're looking forward to even closer association in the year to come. We're using this issue of Agronomy News to let you know who we are--and how we can help you.

Though we're all agronomists, we specialize in different areas. Here is a brief outline of the topics we cover for you:

Marlowe Thorne heads up the Agronomy Department, a man-sized job in itself. He also finds time to work with us in extension, particularly in seeing that we have the best possible in supplies, secretarial help, and the other necessary items needed to back up a strong program.

Ed Runge, seated on the left, covers the field of soil classification. He's busy developing information on the various soil types of the state and the best patterns of use for each.

W. O. Scott covers field crop production and seed improvement. He deals with varieties and planting practices and works closely with certified seed dealers to develop high-quality seed for Illinois farmers. "Scotty" is now a world-wide figure in extension, representing Illinois and U. S. interests on a number of national and international committees.

Ted Peck takes charge of the massive Illinois soil testing program. He keeps tab on approved testing laboratories in the state, making sure that their testing procedures are up to snuff.

Ellery Knake is the number one enemy of Illinois weeds. He heads up a strong extension program in weed control and carries on vigorous campaigns that have helped many Illinois farmers cut their losses due to weeds.

In the rear left of the picture is Roland Weibel. Roland spends most of his time as a wheat breeder, but participates in extension programs on wheat and barley production. Chances are you'll see him discussing wheat varieties at one of our field days next summer. He also heads up our wide-ranging crop variety demonstration program.

Fred Welch has just joined our staff, but he's already digging in. He is working principally on fertility and soil management research, but he will also carry on extension activities in these areas.

Tom Hinesly leads the extension program in tillage practices, soil-water relationships, and soil physics. He also works with soil conservation practices as they apply to modern cropping systems.

Bill Pardee covers crop varieties and production practices. He deals with all field crops, but specializes in forages, serving as chairman of the Illinois forage committee. Bill also heads the annual Agronomy Day committee and edits this Agronomy News publication.

Sam Aldrich (presently on sabbatical leave, so not in this picture) heads up the soil fertility extension program. Well known throughout the country as an authority in his field, Sam has written several books and many articles on various aspects of soil fertility and crop production.

That's who we are and what we do. Chances are you will be hearing from just about all of us at one time or another in 1965--because we are planning a busy season. We'll be coming your way in newspapers, farm magazines, newsletters, over radio and television, and in many county and regional meetings. Our aim is to bring you the latest results in crops and soils research. See you soon!

Samuel R. Aldrich
Thomas D. Hinesly
Ellery L. Knake

William D. Pardee
T. R. Peck
Edward C. A. Runge

W. O. Scott
Marlowe Thorne
Fred Welch

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crops and soils

No. 289

WINTER BRUSH CONTROL

January 19, 1965

If you have brush to kill on your farm, winter is a good time to do the job. You can clean out pasture and fence rows at a time when field work is slack. And with chemicals you can do the job without spending a long time in the cold.

You can kill brush with 2,4,5-T the year round, but it can be most effective during the winter when used as a basal spray. In fact, you're likely to get better control of large or hard-to-kill trees like oaks and maples with winter sprays than with summer foliage treatments. One big advantage of winter treatment is that there is less danger of chemical drift onto susceptible plants. But it's still a good idea to be especially careful, even in winter, when spraying near orchards, shrubs, and ornamental trees. It is always best to spray when there is little or no wind. Be sure that your spray and drift hits only the brush you want to kill.

Treat With 2,4,5-T

For best results, choose the ester form of 2,4,5-T for winter treatment. It kills more species and is more effective on many species than either 2,4-D or 2,4-D and 2,4,5-T mixtures.

Some woody plants are so resistant that even 2,4,5-T will not always give a complete kill the first time. You may have to follow up with another treatment the next year.

After treating, let the treated brush stand for at least one year to give the herbicide time to penetrate deeply and lessen the chance of regrowth.

Basal Sprays for Small Trees and Brush

Use a basal bark treatment, spraying or painting the lower part of the tree trunk with a gallon of 2,4,5-T containing 4 pounds of active ingredient mixed with 25 gallons of kerosene, diesel oil, or fuel oil. This amount is the same as one pint in three gallons of oil.

The spray is most effective when the bark is dry. Be sure to completely encircle the trunk and cover it thoroughly to a height of 15 inches above the ground. Apply the spray until it runs down the bark and begins to wet the soil. And here's a tip: mixing an oil-soluble dye or a little paint with the spray will help you mark the treated areas. One gallon of spray material will treat about 33 trees 3 inches in diameter or about 50 trees 2 inches in diameter.

Foliar and Basal Sprays for Dense Stands

For dense stands, you may be better off to use both foliage sprays during the growing season and winter sprays. You may find it hard to apply basal sprays to such stands because you'll have so many stems to treat. And foliage sprays are only partly effective in dense stands. So use a foliage spray to thin the stand, and then kill the remaining plants the next winter with a basal spray.

Cuts and Frills on Larger Trees

Use the cut-surface treatment for trees over 4 inches in diameter. They often have bark too thick for basal sprays to penetrate well. Apply the herbicide through cuts or frills in the bark. You can make a frill by ringing the trunk of the tree with overlapping axe cuts that penetrate the sap wood at least one-fourth inch. Fill these frills with the basal spray solution given above.

Stump Treatment

Stump treatment helps to prevent regrowth. Apply 2,4,5-T soon after cutting. Again, use the mixture recommended for the basal bark treatment. Spray or paint the tops and sides of the stumps until the solution begins to run off.

Granules and Pellets for Brush Control

Dybar and Urab brush-killers are available as granules or pellets for soil treatment. You can apply them any time that the ground is unfrozen. Late winter or early spring applications usually give best results. Apply these dry materials in a circle halfway between the trunk and the outmost reaches of the branches--the "dripline." Rain dissolves the herbicide and carries it down into the root zone. Do not apply this material near desirable trees, since their roots may grow into the treated area. To kill solid stands, you may want to use broadcast applications instead of making spot treatments.

Whenever you use a herbicide, be sure to read the instructions on the label and follow them carefully.

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crops and soils

January 25, 1965

HOW TO INCREASE YOUR RETURNS FROM OATS

No. 290

If you grow oats, it makes sense to shoot for top returns. Each year many Illinois farmers harvest more than 100 bushels of oats per acre. They may also put up 70 to 80 bales of straw per acre and follow with stubble grazing in the fall. While doing all of these things, they also establish alfalfa seedings. Here are some pointers drawn from agronomy research and farmer experience that may help you get returns like these from your oats:

Early planting pays. Oats are a cool-weather crop. Illinois is a little south of the best climate for this crop, so early planting is a must for top yields. Plant as soon as you can get the land ready. Tests in several states show that you'll lose roughly one bushel per acre for every day you delay seeding your oats.

Prepare a good seedbed. Once over with a disk won't bury heavy cornstalks. Plowing is best. But, if plowing is not practical, you'll get better oat yields if you shred the stalks and disk the ground well.

Fertilize. Too often oats get only the "leftovers." They have to live on plant food left by the corn crop or by soybeans.

Nitrogen can often boost your returns. New varieties have stiffer straw, stand better, and respond more to nitrogen than older varieties. If you're farming timber soil and have put little manure on the field, you should get a profitable yield "kick" from 40 to 60 pounds of nitrogen. But if you're on prairie soil and have grown lots of legumes in your rotation and have put tons of manure on the field, then nitrogen probably won't pay. If you've had troubles with oats lodging in the past few years, then steer clear of nitrogen. But if your oats haven't lodged, you may be able to push up your yield with nitrogen.

Phosphorus helps oats get off to a fast start in the spring. Oats need phosphorus in a hurry, and soluble forms are more readily available than rock phosphate. And don't forget your legume seeding. It may need both phosphorus and potassium. To find how much of these nutrients you need, there's no substitute for a soil test. Your county extension farm adviser can tell you how to take your samples and where to have your soil tested. He can also help you with fertility recommendations.

Select a top variety. In northern Illinois, Shield and Garland have made top yield records for the past several years. Newton, Dodge, and Clintland 60 also have done well. If you have lodging problems, stiff-strawed Goodfield may be your choice. In central Illinois, Garland and Newton are top yielders, while Clintland 60 and Minhafer also do well. Farther south, best choices are Newton and Putnam 61. Newcomers Brave and Clintland 64 show great promise throughout the state, but seed won't be available until next year.

Buy good seed. Certified seed is your best guarantee that you'll get what you pay for! And buy from a reputable seed dealer, one who takes pride in the quality of his seed, not in its low price.

Plant treated seed. Chemical seed treatments kill diseases carried on the seed and protect the seed germinating in the soil. Tests show that you'll get better stands from treated seed. U. of I. plant pathologists report that treated oats average up to 3 more bushels of grain per acre than untreated oats. Last year smut hit many Illinois oat fields and probably infested much of the seed that will be planted this spring. Adequate seed treatment will kill spores clinging to the seed and keep this disease out of your fields. Seed treatment could pay off better in 1965 than in any other recent year.

Use a drill. Illinois tests show that you'll get 7 to 10 bushels extra for drilling instead of broadcasting oats. If your acreage is small, then it may not pay you to buy a drill. But if your acreage is large, or if you plan to grow oats for years, it will pay you to buy, borrow, or rent a drill at oat-planting time.

Other uses for oats. You may also be able to increase your returns from oats by harvesting them for forage. Last year Illinois agronomists harvested more than 12 tons of oat silage, cut just at heading stage. This silage produced almost twice as much TDN per acre as oats from nearby plots that were harvested for grain. With the oats cut this early, the alfalfa seeding produced a hay cutting in September. Best of all, the alfalfa stands were better where the oats were cut for forage than where they were left for grain.

Chances are that you can increase your returns from oats. But, like other crops, oats need a complete program. High fertility won't pay on late-planted oats. Neither will it pay on an outdated variety. On the other hand, the best varieties can't show their merit if fertility is lacking or if seed quality is poor. Many Illinois farmers are putting the pieces together to make a profitable oat-growing program. How about you?

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January 27, 1965

ALFALFA VARIETY TRIALS IN ILLINOIS

No. 291

This report covers recent results of our alfalfa variety testing program as reported by Dr. Carl Hittle. He has compared varieties for reaction to leaf diseases as well as for yield. Both factors are important in your choice of variety.

The results cover four locations: our Northern Illinois Research Center at Shabbona in DeKalb County, our Northeastern Research Center at Elwood in Will County, the Agronomy South Farm at Urbana, and the Carbondale Agronomy Research Farm, operated jointly with Southern Illinois University.

The report includes two types of varieties, those that are adapted to short-term stands of one or two years and those that can serve in either short- or long-term stands. The wilt disease makes the difference, killing out those described as short-term varieties, usually in the third harvest year. Varieties adapted to short- or long-term stands will resist this disease and suffer little or no damage from it.

In considering these data, remember that many factors can cause yields to vary. Yield differences of 2/10 or 3/10 of a ton are usually not significant and may be due only to chance variation.

Last year (1964) was a good year for alfalfa throughout most of Illinois. You will note some extremely high yields, particularly at Urbana. We've talked to a number of farmers in both northern and central Illinois who had yields averaging 7 or 8 tons an acre--from large fields. Top varieties and adequate fertilization contributed to these good results, along with early and frequent cutting. The weather also helped by providing adequate moisture for alfalfa and many bright, sunny days. Improved harvesting equipment helped to reduce field losses.

Note the high yields of all varieties, particularly at Urbana. Growing conditions were excellent, with adequate moisture and bright, sunny weather.

In these tests we also rated plants for leaf diseases as well as for yield. Almost every year leaf spots and other leaf diseases rob Illinois farmers by reducing both yield and quality of their alfalfa. Older varieties are susceptible, while newer varieties can better tolerate the attack of these profit pirates. Table 2 compares these varieties from this viewpoint.

Table 1. Average Alfalfa Variety Yields in Illinois

Variety	Shabbona, DeKalb County		Elwood,	Urbana,
	Test A	Test B	Will County	Champaign County
	1963-64	1964	1963-64	1964
(tons per acre)				
<u>Short-term</u>				
<u>stands, 1-2 yr.</u>				
DuPuits	6.3	7.0	4.7	9.3
FD-100	6.2	6.5	-	8.9
Alfa	5.9	6.6	4.7	8.8
Flamande SC-118	6.3	6.9	-	9.4
<u>Short- or</u>				
<u>long-term stands</u>				
Vernal	5.9	5.6	4.6	8.3
WL202	5.9	-	-	-
Progress	6.2	-	-	-
525	6.0	6.2	-	8.8
Cayuga	6.0	6.2	-	-
Buffalo	5.8	5.5	4.3	8.4
Ranger	5.8	5.6	4.1	8.2

Table 2. 1964 Leaf Disease Ratings

Varieties	DeKalb	Urbana
<u>Short-term stands</u>		
DuPuits	2.0	2.8
FD-100	2.5	2.5
Alfa	2.5	3.5
Flamande SC-118	2.0	2.8
<u>Short- or</u>		
<u>long-term stands</u>		
Vernal	4.0	4.8
Cayuga	4.2	4.2
525	4.2	5.0
Ranger	6.8	6.2

Leaf disease ratings ranged from 1 to 9, 1 indicating no damage and 9 complete leaf destruction.

Note the severe leaf disease rating for Ranger.

Table 3. Illinois Alfalfa Trials, Carbondale
University of Illinois and Southern Illinois University cooperating

Varieties	Tons per acre	
	1963	1964
<u>Short-term stands</u>		
DuPuits	3.0	4.7
FD-100	3.0	4.7
Alfa	3.1	5.1
<u>Short- or long-term stands</u>		
Vernal	2.7	5.7
Cody	2.5	5.8
Buffalo	2.6	5.2
525	3.1	6.0
Ranger	2.6	5.2

In 1963, severe drought at Carbondale reduced yields of all alfalfa varieties. In 1964, bacterial wilt and other factors reduced stands of DuPuits, FD-100, and Alfa; the result was lower yields from these varieties.

In the next issue of Agronomy News we'll discuss each of these varieties, pointing out their various characteristics to help you choose those best suited for your farm.

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crops and soils

February 28, 1965

CHOOSING AN ALFALFA VARIETY

No. 292

As an Illinois farmer, you can now choose from a number of first-rate alfalfa varieties. Here are some hints to help you choose the right alfalfa variety for your farm.

1. First, how do you use alfalfa? For instance, how long do you want to leave the stand down? One or two years--or longer? If the answer is longer, you'll need a variety that is resistant to the bacterial wilt disease, which usually kills out susceptible varieties in the third harvest year. Resistant varieties include Vernal, Buffalo, Cody, and Ranger. But if you want the alfalfa for only one or two years, you don't need to worry about bacterial wilt. Then you can choose a higher yielding but wilt-susceptible variety like DuPuits, Alfa, or FD-100.
2. Also, how often will you harvest your alfalfa? And, most important, how early will you cut or graze? If you can harvest by May 15 in southern Illinois or around June 1 in the northern part of the state, and harvest three or four times per year, then you may want DuPuits, Alfa, or FD-100. These early-maturing, vigorous varieties are designed for top yield and fast "bounce-back." If you can't cut this early, or can't get around to the field until mid-June, then you'll want one of the later maturing varieties like Vernal, Buffalo, or Cody, or one of the newcomers mentioned below.

Varieties for Short-Term Stands (1-2 years)

DuPuits, Alfa, FD-100. These three varieties originated in Europe and are often called Flemish or Flamande-type alfalfas. In Illinois tests they have performed alike. All three grow vigorously, mature early, and yield well. They are designed for farmers seeking top production. They bounce back after cutting or grazing faster than other types and are more tolerant of leafhoppers. All three are susceptible to bacterial wilt, a disease that usually thins stands in the third harvest year. For this reason they're best suited for short rotations, where alfalfa is left down for only one or two years.

Because quality falls off once alfalfa begins to flower, plan to cut these varieties early. Best cutting dates range from early May in southern Illinois to very early June in the northern counties. Farmers who are equipped and willing to cut early will like these varieties best. Delayed cutting will reduce palatability and digestibility.

Northern Illinois farmers growing DuPuits, Alfa, or FD-100 should plan to harvest three times a year; those in central and southern Illinois, four times. When managed in this way, these varieties will provide top yields of high-quality forage. More frequent cuttings are possible and will increase quality, but they generally tend to reduce yield.

The good manager who is looking for top production from his forage acreage and who can harvest early will find these varieties to his liking. The farmer who harvests in mid-June will not.

Varieties for Short- or Long-Term Stands

Vernal is a high-yielding variety that is well adapted to Illinois. It is resistant to bacterial wilt and thus can be grown for more than two years. Vernal has more tolerance to leafhoppers than other varieties. It generally outyields Ranger by at least one-half ton of hay per acre per year. In short rotations it will not equal DuPuits, Alfa, or FD-100 in yield, but it is easier to manage. Since it matures a week to 10 days later than these early varieties, it need not be cut quite so early.

Vernal has a broad crown that helps it to withstand grazing better than the Flemish varieties. An excellent general-purpose variety, it is well adapted anywhere in Illinois. Farmers who are not willing or not equipped to cut the Flemish varieties early will find Vernal better suited to their operation.

Buffalo, a favorite for many years, still does well in southern Illinois. Developed in Kansas, it combines resistance to bacterial wilt and high yielding ability. In trials at Brownstown and Carbondale, it has been superior to Ranger, but sometimes not equal to Vernal.

Cody, included in the 1963 demonstrations, was developed in Kansas from plants selected from Buffalo for resistance to the spotted alfalfa aphid. So far this insect has rarely been a problem in Illinois. In other respects the variety performs about like Buffalo and offers an excellent substitute for it. Cody seed will probably be more plentiful than Buffalo during the next few years.

Progress, WL202, 525, and Cayuga are four new varieties that have been standouts in recent Illinois trials. Similar to Vernal in maturity and bacterial wilt-resistance, they have equaled and sometimes topped Vernal in yield. Seed supplies are not yet plentiful, but the chances are that you'll be hearing more about these newcomers.

Ranger, a popular old-timer, is now obsolete, falling below modern varieties in yield and in susceptibility to leaf spots and leafhoppers. Ranger has had a great history, but it can no longer match these lusty newcomers.

Look for Certified Seed

When buying seed of any of these varieties, look for certified seed to be sure that you're getting what you pay for. Uncertified seed often does not perform like the variety named. For best results, buy certified seed from a responsible dealer who sells quality seed rather than cheap seed.

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Extension Agronomist

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PERFORMANCE OF COMMERCIAL CORN HYBRIDS IN ILLINOIS, 1962-1964

The tables below present data from commercial hybrid corn trials conducted by the Department of Agronomy. Figures represent the average results for the three years 1962, 1963, and 1964.* More detailed information will be given in Circular 903 entitled "Performance of Commercial Corn Hybrids in Illinois, 1962-1964, which will soon be available from the Information Office, 112 Mumford Hall, University of Illinois.

Seed samples were collected by representatives of the University directly from the warehouses and seed supplies of producers entering the test. Tests were planted and harvested by machine to correspond as closely as possible with actual farm methods.

When considering a hybrid, remember that, while yield is important, so are maturity (indicated by percentage moisture at harvest) and standability. Check all three before making decisions. Pick those that have performed well at test sites near your farm. Ask seed company representatives about disease resistance of the hybrids and their tolerance to crowding and adaptability to your particular soil. Then try them out in strips beside your present hybrids. The best hybrids for you are those that put the most grain in your crib or hopper.

Table 1. — EXTREME NORTHERN ILLINOIS: Woodstock

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	bu.	percl.	percl.
Pioneer 371.....	81	21.5	91
Illinois 1961 (Station).....	81	23.4	97
Cargill S412.....	87	23.5	91
Pioneer 3414.....	80	24.0	90
DeKalb 238.....	83	24.2	92
Pioneer 354.....	78	24.2	93
DeKalb XL-45.....	85	24.4	96
Cargill 259.....	80	25.6	91
DeKalb 441.....	80	26.4	96
DeKalb 640.....	86	28.0	97
Average of all entries for the three years*.....	77	24.6	91

Table 2. — NORTHERN ILLINOIS: DeKalb

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	bu.	percl.	percl.
Pioneer 371.....	102	19.3	92
DeKalb 400.....	104	20.2	94
Illinois 1961 (Station).....	110	20.3	96
Crib Filler 43.....	110	21.0	98
Pioneer 3414.....	118	21.3	96
DeKalb 441.....	114	21.3	95
DeKalb 805.....	117	21.5	98
DeKalb XL-361.....	130	21.8	97
DeKalb 633.....	118	21.8	94
Wyffels W-600.....	111	22.1	97
Pioneer 328B.....	121	22.3	99
Pioneer 328A.....	123	22.4	98
Pioneer 321.....	120	22.6	94
Corn King 213.....	118	22.9	97
Pioneer 328C.....	117	23.2	97
DeKalb 640.....	127	23.3	98
Average of all entries for the three years*.....	109	22.2	96

Table 3. — WEST NORTH-CENTRAL ILLINOIS: Galesburg

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	bu.	percl.	percl.
Pioneer 3284.....	110	17.5	95
Whisnand 814.....	117	17.9	90
Pioneer 3359.....	109	18.4	90
DeKalb 640.....	123	18.7	93
Tiemann T-78.....	100	18.7	87
Farmers Best 77.....	101	19.0	91
Bear OK848.....	111	19.1	94
Bear Unicorn X600.....	119	19.2	88
Moewa 90A.....	104	19.2	90
Ainsworth X-97.....	104	19.3	90
Pioneer 328B.....	113	19.4	91
Pioneer 314.....	113	19.6	95
McAllister 23A.....	112	19.6	96
Moewa 560.....	100	19.6	88
P.A.G. SX29.....	114	19.7	91
DeKalb 633.....	112	19.7	92
Van Horn VH624.....	109	19.7	91
United-Hagie UH1158.....	125	19.8	87
Farmers Best 500.....	99	19.8	96
McAllister 77B.....	111	19.9	90
Whisnand 852.....	100	19.9	91
Troyer M33.....	111	20.0	94
DeKalb 824.....	112	20.3	89
McAllister 6104.....	111	20.3	94
Pioneer 321A.....	112	20.5	91
Troyer M44.....	118	20.6	93
Pioneer 3304.....	115	20.6	95
Moewa 700.....	103	20.7	95
Pioneer 321.....	124	20.9	91
Bear Unicorn X800.....	116	21.8	95
Average of all entries for the three years*.....	106	19.5	92

Table 4. — EAST NORTH-CENTRAL ILLINOIS: Ashkum

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	bu.	percl.	percl.
Pioneer 3359.....	127	17.8	95
DeKalb 805.....	101	18.8	88
Ainsworth X-96.....	99	18.9	90
Pioneer 3284.....	105	19.1	96
Van Horn VH109.....	105	19.2	95
Pioneer 328B.....	104	19.2	89
Cargill 330.....	108	19.5	86
Frey 892.....	100	19.5	89
Van Horn VH624.....	106	19.9	90
DeKalb 824.....	100	20.0	88
Pioneer 321.....	111	20.2	91
Troyer M13TT.....	94	20.2	91
Pioneer 321A.....	121	20.3	90
Troyer M33.....	97	20.4	91
United-Hagie UH158.....	113	20.6	89
Crib Filler 66.....	113	20.6	88
Crib Filler 78.....	100	20.9	79
Pioneer 3304.....	119	21.4	97
Crib Filler 123.....	100	21.7	86
Average of all entries for the three years*.....	100	19.8	90

* Many hybrids were entered for only one or two years. These are included in Circular 903.

Table 5. — WEST-CENTRAL ILLINOIS: Augusta

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	<i>bu.</i>	<i>percl.</i>	<i>percl.</i>
Whisnand 814.....	111	18.2	95
Moews 524.....	104	18.2	94
Pioneer 321.....	117	19.3	95
Troyer M44.....	113	19.4	96
Whisnand 852.....	109	17.4	94
Pioneer 3304.....	111	19.7	98
DeKalb 633.....	93	19.7	92
Pioneer 312A.....	113	20.1	90
Ainsworth SD-36.....	103	20.3	95
Average of all entries for the three years.....	103	19.2	94

Table 7. — EAST-CENTRAL ILLINOIS: Urbana

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	<i>bu.</i>	<i>percl.</i>	<i>percl.</i>
Pioneer 321A.....	138	17.0	98
Pioneer 3284.....	129	17.0	98
DeKalb 640.....	129	17.2	100
Whisnand 814.....	129	17.2	97
Frey 506.....	127	17.4	99
P.A.G. SX29.....	137	17.5	99
Schenk S-73.....	127	17.5	99
Van Horn VH624.....	128	17.6	98
P.A.G. SX19.....	123	17.6	98
Moews 524A.....	114	17.6	98
Pioneer 3304.....	137	17.7	99
Ainsworth X-98A.....	123	17.8	99
Bear OK878.....	123	17.9	99
Super-Croat 891.....	123	18.0	99
Crib Filler 116.....	120	18.0	96
DeKalb 824.....	123	18.1	97
Pioneer 321.....	132	18.2	98
Crib Filler 123.....	123	18.2	96
Troyer M44.....	118	18.2	98
Princeton 840-A.....	113	18.2	96
Crib Filler 134.....	133	18.3	97
Ainsworth X-6.....	121	18.3	99
Frey F60.....	131	18.4	99
Whisnand 852.....	129	18.4	97
Princeton 8-A.....	114	18.5	99
Crib Filler 78.....	124	18.8	97
Crib Filler 66.....	130	18.9	99
Princeton 990-A.....	123	22.6	97
Average of all entries for the three years.....	121	17.9	98

Table 6. — CENTRAL ILLINOIS: Stanford

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	<i>bu.</i>	<i>percl.</i>	<i>percl.</i>
Mountjoy M-100.....	109	20.2	87
P.A.G. SX29.....	123	21.0	95
Ainsworth X-6.....	117	21.0	93
Illinois 3346 (Station).....	115	21.0	89
Whisnand 814.....	120	21.3	87
Pioneer 3304.....	127	21.7	95
P.A.G. SX19.....	122	21.7	84
Illinois 3347 (Station).....	120	21.7	90
Van Horn VH622.....	117	21.7	85
Crib Filler 66.....	115	21.8	89
Frey F60.....	125	21.9	90
Pioneer 321.....	121	22.0	88
Todd 855.....	115	22.4	89
Frey F57.....	113	22.4	94
Whisnand 852.....	106	22.4	86
Pioneer 321A.....	139	22.6	90
Illinois 3348 (Station).....	98	22.6	85
Van Horn VH624.....	116	22.8	87
Crib Filler 78.....	113	22.8	89
Moews 90A.....	109	22.8	89
Pioneer 302B.....	122	22.9	88
Average of all entries for the three years.....	112	21.7	90

Table 8. — WEST SOUTH-CENTRAL ILLINOIS: Greenfield

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	<i>bu.</i>	<i>percl.</i>	<i>percl.</i>
DeKalb 640.....	119	15.9	97
Illinois 8029 (Station).....	132	16.3	92
DeKalb 805.....	114	16.3	96
Moews 69A.....	115	16.6	98
Bear OK848.....	122	16.9	96
Illinois 8010 (Station).....	127	17.2	93
Van Horn VH624.....	118	17.2	95
Pioneer 3304.....	122	17.5	99
Ainsworth X-100.....	127	18.0	96
DeKalb 824.....	113	18.0	94
Pioneer 321.....	130	18.2	95
Pioneer 312A.....	128	18.7	90
Pioneer 309B.....	138	21.1	92
Average of all entries for the three years.....	117	17.8	93

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PERFORMANCE OF COMMERCIAL CORN HYBRIDS, 1962-1964 (Cont.)

In this issue we continue the report on the 1962-64 commercial corn hybrid testing programs. These results list only those hybrids entered in all three years. Many additional hybrids were entered for two years in 1963 and 1964, but are not included here because of lack of space. We will include these two-year yields in Circular 903, "Performance of Commercial Corn Hybrids in Illinois, 1962-64," which will soon be available from your county extension farm adviser or from the Information Office, 112 Mumford Hall, University of Illinois College of Agriculture, Urbana, Illinois. Also in this circular you'll find detailed information on planting dates, soil type, fertility practices, and cropping history for each of the test sites included in this program.

The key persons in this testing program were University of Illinois agronomists G. K. Ross and K. E. Williams, who carried out the many exacting details as well as the hard work needed to get this job done. Farm advisers, seedsmen, and farm cooperators also contributed essential assistance.

Table 9.—SOUTHERN ILLINOIS: Brownstown

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	<i>bu.</i>	<i>percl.</i>	<i>percl.</i>
Pioneer 3304.....	72	16.8	90
Tiemann T-78.....	65	17.8	88
Bear Unicorn X600.....	76	17.9	92
Bear OK96A.....	71	17.9	86
Pioneer 314*.....	70	18.3	88
Van Horn VH624.....	70	18.5	94
Van Horn VH622.....	69	18.5	81
Crib Filler 78.....	77	18.8	84
Pioneer 321.....	70	18.8	86
Stull's 101Y.....	79	19.3	87
Schenk S-73.....	67	19.3	81
Pioneer 312A.....	66	20.3	85
DeKalb 898B.....	70	21.0	92
Ainsworth X-100.....	67	21.2	93
Pioneer 309B.....	61	23.7	93
DeKalb 1006.....	67	23.9	93
Average of all entries for the three years.....	65	19.3	88

Table 10.—EXTREME SOUTHERN ILLINOIS
BOTTOMLAND: Dixon Springs

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	<i>bu.</i>	<i>percl.</i>	<i>percl.</i>
Whismand 830.....	109	16.9	93
Pioneer 321.....	119	18.2	100
Princeton 840A.....	90	18.4	97
Illinois 9001 (Station).....	117	18.6	97
Schenk S-73.....	102	18.6	96
Princeton 8-A.....	97	19.0	98
Burgdorf B-846.....	92	19.0	96
Stull's 101Y.....	114	19.1	94
Pioneer 312B.....	109	19.5	94
Ainsworth SD-36.....	106	19.5	99
Ainsworth X-100.....	106	19.6	97
Pioneer 3304.....	105	19.6	99
Pioneer 312A.....	111	19.8	95
Burgdorf B-99W.....	108	19.8	96
Pioneer 302B.....	104	19.8	95
Illinois 3364 (Station).....	115	20.8	96
DeKalb 1006.....	119	21.0	98
Princeton 990-A.....	115	21.1	97
DeKalb 1004.....	110	21.6	92
DeKalb C912.....	119	22.8	99
Pioneer 309B.....	111	24.1	97
Average of all entries for the three years.....	106	19.6	96

Table 11.—EXTREME SOUTHERN ILLINOIS UPLAND:
Carbondale

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	<i>bu.</i>	<i>percl.</i>	<i>percl.</i>
Illinois 9001 (Station).....	57	16.6	91
Whismand 830.....	65	16.9	91
Pioneer 3304.....	64	16.9	79
Princeton 840-A.....	52	17.0	85
Ainsworth SD-36.....	67	17.6	95
Illinois 1851 (Station).....	60	17.6	90
Stull's 101Y.....	60	17.6	84
Princeton 8-A.....	55	17.6	91
Burgdorf B-846.....	57	17.7	89
Schenk S-73.....	49	17.7	83
Pioneer 321.....	57	18.1	90
Burgdorf B-99W.....	55	18.3	90
Pioneer 312A.....	59	18.5	90
Pioneer 302B.....	56	18.5	94
Pioneer 312B.....	55	18.6	88
Ainsworth X-100.....	49	19.0	94
Princeton 990-A.....	49	19.1	93
Illinois 3364 (Station).....	57	20.0	91
DeKalb 1004.....	47	20.1	86
DeKalb 1006.....	55	21.5	93
DeKalb C912.....	44	21.9	91
Pioneer 309B.....	48	22.2	91
Average of all entries for the three years.....	54	18.1	88

Table 12. — INCREASED PLANTING RATES —
NORTHERN ILLINOIS: DeKalb
(20,000 plants per acre)

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	bu.	perct.	perct.
Pioneer 371.....	104	18.9	95
Pioneer 354*.....	98	20.8	87
Pioneer 3414.....	120	21.4	92
DeKalb 441.....	118	21.5	95
Illinois Hy2 x Oh7 (Station).....	121	21.8	91
Pioneer 328C.....	123	22.6	92
Pioneer 3284.....	121	22.6	98
Pioneer 321.....	128	22.8	93
DeKalb 633.....	118	22.9	93
DeKalb 640.....	127	23.2	95
Pioneer 328B.....	124	23.2	95
Average of all entries for the three years.....	112	21.4	93

Table 13. — INCREASED PLANTING RATES —
EAST-CENTRAL ILLINOIS: Urbana
(20,000 plants per acre)*

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	bu.	perct.	perct.
Illinois Hy2 x Oh7 (Station).....	106	17.1	89
DeKalb 640.....	120	17.4	95
Pioneer 3284.....	117	17.9	96
P.A.G. SX29.....	116	18.4	100
Pioneer 3304.....	105	18.6	95
Frey F62.....	123	18.8	96
P.A.G. SX19.....	107	18.8	91
Crib Filler 116.....	101	18.8	91
Pioneer 321.....	111	19.2	94
Pioneer 321A.....	109	19.3	88
Whismand 852.....	108	19.5	91
Average of all entries for the three years.....	94	18.0	93

Table 14. — INCREASED PLANTING RATES — WEST
SOUTH-CENTRAL ILLINOIS: Greenfield
(20,000 plants per acre)

Entry	Total acre yield	Moisture in grain at harvest	Erect plants
SUMMARY: 1962-1964			
	bu.	perct.	perct.
Illinois Hy2 x Oh7 (Station).....	108	15.6	71
Pioneer 3304.....	129	17.4	94
Illinois 8010 (Station).....	129	17.7	85
Pioneer 321.....	137	17.8	83
Pioneer 312A.....	110	19.3	89
Pioneer 309B.....	135	21.2	88
Average of all entries for the three years.....	119	17.2	89

* Because of field conditions in 1964, the 20,000 rate test was planted 16 days later than the 16,000 test. Dry weather seriously reduced yields of this late planting, pulling down the three-year average for the increased planting rate.

We hope that this information will be helpful to you in selecting better corn hybrids for your farm.

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GOOD SEED PAYS--AND ALL SEED IS NOT GOOD!

How good is the seed you'll plant this spring? Unless it has been recently tested and tagged, it may not be so good as you think. A recent on-the-farm survey in Illinois showed that many farmers were sowing seed that was unfit to plant.

Let's take clover seed as an example. Giant foxtail (wild millet) and buckhorn are common weeds in red clover seed, and farm fanning mills won't take them out. Professional seed houses use specialized equipment to remove these weed seeds, employing the latest technology. In this survey, seed from such sources was practically weed-free.

But the same was not true of seed that was home-grown or bought from neighbors. Often such seed had not been cleaned or had been poorly cleaned. Many lots contained giant foxtail, buckhorn, and other noxious weeds. One farmer was planting 14,265 buckhorn seeds plus 16,320 giant foxtail seeds per acre in his home-grown red clover seed. Another was sowing 162,000 foxtail seeds per acre along with an occasional Canada thistle. He had bought his seed from his neighbor. A number of other farmers were planting seed that was this bad--or even worse.

This kind of seed is expensive any way you look at it. Once seeded, giant foxtail can become a costly problem for years to come. Conservatively, it may cost about \$5.00 an acre to control this pest in subsequent soybean and corn crops--or even greater loss from reduced yields. These farmers were reseeding their own--or their neighbor's--weed problem.

These on-farm surveys also showed that many farmers were sowing seed with low vigor. Over 20 percent of the seed germinated below the 80 percent level usually considered the minimum for acceptable germination. A number of lots were far below this mark, and some lots did not germinate at all. Much of this poorly germinating seed had been carried over from seed bought for planting the previous year.

Illinois leads the nation in producing red clover seed, and our professional seed companies clean and merchandise a high-quality product. Seed analysts test and tag this seed for germination, purity, and weed seed content. State seed inspectors keep close tab on such seed, checking carefully to be sure it's up to snuff. The net result is a better product for you.

But farmers who plant their own seed have no check on either germination or weeds. Nor do they have this assurance of quality when they buy untagged seed from their neighbor. Such seeds ranked lowest in quality in these recent surveys.

Other on-farm surveys have examined the quality of oats planted by Illinois farmers. Many were planting high-quality oats--but some were not. In fact, about one-third of the oats examined in this survey were unfit for planting for

one or more reasons. Some were low in germination--in fact, several lots wouldn't germinate at all. Others carried weed seeds, particularly quackgrass and Canada thistle. Some lots were misnamed as to variety. Here again seed grown at home or bought from neighbors ranked lowest in quality. Seed cleaned by elevators was somewhat better, while seed cleaned and merchandised through professional seed companies ranked highest.

We usually recommend certified seed as the best guarantee of quality performance--since it must meet high standards before it can receive the certified tag. This tag is your best assurance of varietal purity. But if you can't get certified red clover seed, your best bet is to buy seed that has been cleaned, tested, and tagged by professional seedsmen.

Most important, look for the tag on the bag. The information it gives is important. Look for seed that has a high germination rate, ranks high in purity, and has little or no weed seed.

If you plan to sow your own seed, by all means have it tested. You can get five free samples tested each year by the Seed Testing Laboratory, State Department of Plant Industries, State Fairgrounds, Springfield, Illinois. The chances are that you can get sample bags and mailing instructions from your county extension farm adviser. Check your test results and discard the seed if it's faulty.

Good seed pays in today's agriculture. A figure worth remembering is that seed makes up only 5 to 10 percent of the cost of growing a crop--yet it's the starting point for your whole production. Paying a few more dollars for the best available seed will often assure you that the other 90 to 95 percent of your costs will not be wasted. Seed experts have coined this phrase: "Good Seed Pays Poor Seed Costs." It's worth remembering.

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AGRONOMY NEWS

crops and soils

February 25, 1965

No. 296

SUGGESTIONS FOR USING NITROGEN ON WHEAT THIS SPRING

Your nitrogen program can greatly affect both yield and profits from your wheat crop. It can also affect the alfalfa or clover seeded in your wheat. Needed phosphorus and potassium should have been applied at or before planting time last fall.

Wheat usually increases in yield with extra nitrogen up to the point where lodging occurs. And new stiff-strawed varieties can take more nitrogen before lodging than "older" varieties. Nitrogen boosts yields most on the light-colored soils of southern and south-central Illinois, that is, south of a line from Paris to Alton. Coarse-textured sands and sandy and gravelly loams also need extra nitrogen in the spring because nitrates leach through such soils more rapidly than through silt loams.

Most Illinois wheat fields will respond to nitrogen topdressing. Rely on your own experience with straw height and lodging in previous years on the same field to decide what rate to apply as you study the suggested rates in the table.

Apply nitrogen about the time wheat greens up. On level fields, you may apply it on frozen ground. On sloping fields, let the ground thaw to prevent runoff loss. If wet soil forces you to delay application, you may still apply nitrogen until the wheat is 8 to 10 inches tall. Refer to the table on the back for total nitrogen rates. Subtract the amount applied at planting time to find the rate to topdress in the spring.

Amounts of Nitrogen Suggested for Different Soil Situations

Soil	Total nitrogen, fall and spring	
	With alfalfa or clover seeding	No seeding
	(lb. per acre)	
Low in organic matter, no manure or clover for two years	40-50	50-60
Medium in nitrogen-supplying capacity	20-50	30-50
High in nitrogen-supplying capacity (includes light-colored soils that have recently had legumes or manure and dark-colored soils)	0	20-30

Recent research shows that new soft wheat varieties respond more to nitrogen than hard wheats. If you have a stiff-strawed soft wheat, try an extra 25 pounds of nitrogen per acre on part of it.

Generally the minimum practical application is about 20 pounds. At lower rates, spreading costs become too high in relation to the amount of plant food that is applied.

For first-hand information on conditions in your county, check with your county extension farm adviser. He can give you specific recommendations to fit your soils.

S. R. Aldrich

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crops and soils
 No. 297

February 24, 1965

WHAT'S THE LATEST ON NARROW-ROW CORN?

One of the hottest topics this winter is narrow-row corn. Will 30-inch corn rows pay--and, if so, where and when?

First let's look at yield results from Dr. J. W. Pendleton's research at Urbana.

1964 Narrow-Row Corn Yields

Agronomy South Farm, Urbana, Illinois

Plant population at harvest	Row spacing (bu./acre)	
	40"	30"
16,000	122	122
20,000	123	127
24,000	119	133
28,000	119	124
32,000	<u>112</u>	<u>122</u>
Average	119	126

Note that yields were highest for 30-inch rows at a planting rate of 24,000 per acre. However, this yield was for an experimental single-cross hybrid (B37 x OH43) that is known to do well at high population rates. This hybrid tends to be short and early at Urbana, and it suffered from drought in July and August that reduced general corn yields by 25 to 40 bushels below 1963.

Putting together results from trials like this both in Illinois and elsewhere, Dr. Pendleton comes up with the following suggestions:

Don't switch to narrower rows:

- If your corn yield level is below 120 bushels an acre in good seasons. Check other factors in your program first. Narrow-row corn won't pay at yields below this level.
- If your planting rate is less than 20,000 per acre.
- If your acreage of corn and soybeans is small.
- Do start thinking seriously about narrower rows:
 - If you farm a large acreage of corn and soybeans.
 - If you have harvested yields above 120 bushels an acre in recent years.
 - If your planting rate exceeds 20,000 per acre and you are on a high fertility program, control weeds, and harvest early.
 - If your harvest equipment and other machinery is worn and you are thinking of trading in the near future.
 - If you enjoy being the first to start a new practice.

Here are some further suggestions that may help you make your decision:

First, you will benefit from going from 40- to 30-inch row widths only if you already have a high yield level--and then you will average only about 5 percent more corn. This difference is small and often hard to measure on the farm or in experimental plots. Sometimes yield is increased by 15 bushels, sometimes not at all. However, we've seen no reports of experiments in which 30-inch rows yielded less than 40-inch rows.

In general, the biggest yield boosts come from narrowing from 40 to 30 inches. Usually there is little additional advantage from reducing further--from 30 to 20 inches. And machinery problems increase.

In our trials, the shorter, earlier hybrids often did better in narrow rows than tall, late varieties. And early planting also seemed to favor narrow rows.

You'll need good early weed control in narrow rows, but earlier shading of the ground may eliminate the need for the last cultivation. This shading may also reduce water evaporation from the soil.

Several farm implement companies are now marketing equipment to harvest both corn and soybeans in narrow rows. Chances are that more will soon follow suit. Equipment for narrow-row corn will allow you to switch to 30-inch soybean rows. And here we've consistently averaged 10 to 15 percent more yield.

If you're planning to go to narrower rows, be particularly careful in choosing your hybrids. Remember, high populations and narrow rows can mean more lodging. Choose only hybrids that are adapted to high populations and noted for their stalk strength. You can check these characteristics in Circular 903, "Commercial Corn Hybrids in Illinois," available at your farm adviser's office or from the Information Office, Mumford Hall, University of Illinois College of Agriculture, Urbana, Illinois. Your hybrid seed corn dealer can also help you select such hybrids.

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Research Agronomist

W. D. Pardee
Extension Agronomist

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crops and soils

February 25, 1965

No. 298

SPRING BARLEY RECOMMENDATIONS FOR 1965

When the first signs of spring appear, it's time to get busy if you are planning to grow spring barley. Farmers in northern and north-central Illinois find spring barley well adapted to the cool, moist weather of early spring. Barley seedlings will tolerate cold weather, and the "earlier the better" therefore applies so far as seeding is concerned.

You can grow barley varieties of two types--either feed or malting. In Illinois it makes sense to choose a malting variety. Malting barley usually brings a premium about one-third above the feed barley price. If your barley meets malting requirements, you can sell it at a good profit and afford to buy feed barley--or some other feed grain. However, if weather conditions prevent the crop from reaching malting quality, then it will still make good feed.

Quality at harvest time is important. To receive the malting barley premium, your seed must be plump, sound, mature, and free from disease and foreign material. The test weight per bushel must be at least 43 pounds. Germination must be good and uniform.

Here are some pointers to help you grow good-quality seed: Don't harvest until the straw is completely yellow and the kernels are hard. Be sure the grain moisture is down to 14 percent before combining. Adjust your combine to prevent damage to the grain. (In malting barley, skinned and broken kernels can't exceed 10 percent.) Clean storage bins thoroughly, and make them rodent- and bird-proof. Foreign material can't exceed 3 percent.)

Plant breeders have developed superior malting barleys that yield well, resist many diseases, and won't lodge. Our nursery tests from Urbana and Shabbona show some excellent results:

1964 Nursery Test at the Northern Illinois Research Center, Shabbona

Variety	Yield (bu./acre)		Test weight (lb./bu.)		Plant height (in.)	Lodging %
	1964	62-64	1964	62-64		
Trail	72	63	46.6	46.2	32	0
Trophy	69	66	45.6	45.3	31	0
Redwood	56	55	44.6	45.4	30	30
Frontier	69	59	46.2	46.2	31	10

Variety	Yield (bu./acre)		Test weight (lb./bu.)		Plant height (in.)	Date of heading in June
	1964	62-64	1964	62-64		
Traill	45	52	46.6	46.2	24	3
Trophy	42	49	45.6	45.3	24	3
Kindred	42	47	44.6	45.4	24	3
Forrest	52	55	44.2	46.2	27	6

The two varieties recommended for Illinois are Traill and Trophy--both acceptable for malting and brewing.

Traill, released by North Dakota in 1956, has a somewhat higher yield and a stiffer straw than Kindred. It reacts in about the same way as Kindred to Septoria, Helminthosporium, stem rust, and other barley diseases.

Trophy, released by North Dakota in 1961, is a six-rowed, rough-awned barley with colorless aleurone. It is similar to Traill and Kindred in plant height, date of heading, and test weight, but has a higher percentage of plump kernels. In yield and straw strength, it is superior to Kindred, but similar to Traill. It is similar to Traill in disease resistance.

Kindred is no longer recommended because its weak straw tends to break easily after ripening, requiring immediate harvest.

Forrest is a feed barley and is therefore inferior (premium-wise) to the malting types for use in Illinois.

Growing spring barley can be risky. Hazards include hot, dry weather, chinch bugs, and scab disease. Seeding early helps to prevent hot weather injury.

Scab, a fungus disease, is an ever-present threat to barley production in Illinois. When the disease attacks early, it stops grain development, producing a mummified kernel that will not germinate. The amount of fungus damage depends on the environment, especially temperature and moisture relationships during heading and early seed development. Barley should not follow a cereal crop unless all residues, stalks, and straw are completely covered in plowing. Scabby barley, labeled "blighted," is not suitable either for malting or as feed for hogs.

If you grow spring barley, keep these points in mind: Use a malting variety, prepare a good seedbed, and plant early. Don't forget that barley is the least competitive companion crop you can sow with a forage seeding.

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March 15, 1965

No. 299

PRE-EMERGENCE HERBICIDES FOR CORN - 1964

Illinois farmers will apply pre-emergence herbicides on more than one-fourth of the state's corn acreage in 1965. Should you use one or more of these chemicals? If you are already doing a good job of controlling weeds with your rotary hoe and cultivators, then you may not need chemicals. But if you're not getting the control you'd like, pre-emergence weedkillers may pay off.

Your soil type can affect your choice of herbicide. For instance, Randox has done well on the darker soils where annual grass weeds like foxtail are the main problem. Atrazine has done an exceptionally good job on lighter soils that are relatively low in organic matter. Atrazine often performs well on moderately dark soils too. But its effectiveness decreases as the organic matter increases, so you'll need to use more on the darker soils than on the lighter ones. On sandy soil it is the best chemical that is available.

Your particular weed problem will help to determine the herbicide to use. If you are troubled with both grass and broad-leaved weeds, you have several choices. Atrazine controls both annual grasses and broad-leaved weeds. Or you can use Randox to control grass and then apply 2,4-D soon after the crop is up to control broad-leaved weeds. Another choice is Randox-T, which is similar to Randox but has the "T" material added to help control broad-leaved weeds. If grass alone is your problem, then consider Randox alone.

2,4-D ester may also be used for pre-emergence weed control in corn. Although it costs less than other herbicides, it has not been so effective. However, if you're lucky and get rain within a few days after application, 2,4-D ester can control annual grasses as well as broad-leaved weeds.

Should you use spray or granules? For 1965 the answer is clear-cut once you decide which herbicide to use. Atrazine is now available only as a wettable powder for spray applications. Randox and Randox-T are available in both liquid and granular forms, but most farmers prefer the granules, since they are less irritating. 2,4-D also is available as liquid and granules, and you can use either one. The liquid and granular forms of these herbicides are about equally effective for controlling weeds.

You should also consider the possibility of chemical residue in your soil. Atrazine often provides spectacular season-long control of weeds, but it may damage sensitive crops like oats or soybeans if part of it carries over into the next season. To avoid such damage, use no more than the amount recommended for your soil type. And be sure to agitate it well in the spray tank. To play it safe, don't use atrazine the year before planting crops other than corn.

In a few instances Radox-T also has carried over into the next season, damaging soybeans. But where the recommended rate is used, it's doubtful that the damage would be sufficient to lower yields. Radox and 2,4-D present no carry-over problems.

Corn shows good tolerance to both atrazine and Radox. Its tolerance to Radox-T is not quite so good, but at recommended rates there is usually no problem. It is occasionally injured by 2,4-D, especially if heavy rains wash the chemical down around the seed.

Knoxweed is a new pre-emergence herbicide that now has label approval for corn. A combination of Eptam and 2,4-D, it controls both annual grasses and broad-leaved weeds. This year we suggest it for trial use only. It is less irritating than Radox or Radox-T and leaves less residue than atrazine. Corn probably does not tolerate it so well as atrazine or Radox. Knoxweed will be available in both liquid and granular form. It does not need to be incorporated.

Eptam gives better control of Johnsongrass seedlings and wild cane than any of the other herbicides mentioned for corn. Although it may sometimes injure corn, the damage usually is not nearly so great as that from these two serious weeds. Eptam needs to be incorporated into the soil immediately after application. Although considered somewhat better on grass weeds, Eptam also controls some broad-leaves.

Ramrod is a new pre-emergence herbicide that recently received label clearance for use on corn. Corn tolerance appears to be satisfactory. Ramrod is less irritating than Radox. It appears to control some broad-leaved weeds better than Radox does, and it seems to perform better on the light-colored soils. Limited quantities will be available this year to permit further evaluation.

Amiben has label clearance for corn at the rate of two pounds per acre. However, our research indicates that corn does not have sufficient tolerance to make its use feasible in Illinois.

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March 22, 1965

INDEX TO AGRONOMY NEWS NO. 100 TO 300

No. 300

This index to current Agronomy News can serve as a handy guide to make your personal set a useful reference. If you would like any of these back issues, send us a card giving numbers and titles, and we will send them to you.

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crops and soils

March 19, 1965

PREEMERGENCE HERBICIDES FOR SOYBEANS, 1965

No. 301

Not every farmer needs to use preemergence herbicides on his soybeans. There's no point in using them just to be fashionable. First consider timely rotary hoeing and row cultivation. If these practices have not been adequate, preemergence herbicides can help out.

Unfortunately, soybeans are more sensitive than corn to most preemergence herbicides. On the other hand, soybeans are more able than corn to outgrow the damage and fill in if the damage has not been too severe.

The major preemergence herbicides for soybeans are Radox, Amiben, Alanap, and Sodium PCP. Lorox, Treflan, and Vernam are more recent introductions.

Radox has given good control of annual grass weeds, particularly on the darker soils with relatively high organic matter. There is less chance of damage to soybeans from Radox than from any other herbicide used for soybeans. Most users prefer granules to help reduce irritation. A change in container design for 1965 may further reduce the irritation problem. Although label clearance has been obtained for increasing the rate from four to five pounds (active ingredient broadcast) per acre, the four-pound rate has generally been adequate in Illinois. Be sure that you do not use Radox-T on soybeans.

Amiben has generally controlled weeds better in soybeans than the other herbicides. Occasionally Amiben noticeably injures soybeans. Although the reason is not definitely known, damage seems to occur when rain moves the Amiben into contact with the seed soon after planting and there is no additional moisture to move or dilute it further. Soybeans can usually outgrow this damage. Although the problem does not occur often enough to cause great concern, it would be preferable to have better crop tolerance.

There has been some question about the rate of Amiben to use. The three-pound rate (active ingredient broadcast per acre) gives better control than two pounds, but the two-pound rate costs less and is less likely to cause injury. Most research workers in the midwest favor 2 1/2 or 3 pounds.

Alanap was one of the first preemergence herbicides used for soybeans. It controls both annual grasses and broad-leaved weeds. Where smartweed is a problem, a commercial mixture of Alanap and CIPC may be used, since Alanap alone will not do the job. Soybeans do not have exceptionally good tolerance to either Alanap or the mixture with CIPC, and some damage therefore may occur.

Sodium PCP is sold under the trade name of Weedbeads. The material may be applied dry with a granule applicator or may be mixed with water for spraying. It controls broad-leaved weeds better than grasses. It performs better on light-colored,

low-organic-matter soils than on the darker soils and thus is better adapted to the southern parts of Illinois than farther north. Soybeans may show contact "burn" if the chemical comes into contact with the roots or if rain splashes it onto the leaves. Sodium PCP is irritating and causes sneezing, so it must be used carefully.

Preemergence herbicides for trial use

Lorox has label clearance for preemergence use on soybeans, but you'll probably do best to use this herbicide only on a trial basis. Soybeans do not have good tolerance to Lorox, and damage is sometimes evident. Be sure to adjust your rate for your soil type. The range is from 1 pound active ingredient on silt loams with low organic matter to 2 1/2 pounds active on dark-colored clay loams. It probably has its greatest potential on the lighter colored soils.

Treflan also has label clearance for preemergence use for soybeans. For the present, however, we suggest it primarily for trial use to control wild cane and Johnsongrass from seed. Since you must incorporate this chemical immediately after application, one method is to broadcast it and then disk twice with a tandem disk. Application rate ranges from 1/2 to 1 pound (active ingredient broadcast per acre), depending on soil type. Treflan can control foxtail, wild cane, Johnsongrass seedlings, pigweed, lambsquarter, and smartweed; but its control of velvetleaf, cocklebur, and jimsonweed is poor. Soybeans do not tolerate Treflan to a high degree, and crop injury may occur. More research is needed to determine what happens to this herbicide in the soil.

Vernam, formerly referred to as R1607, is suggested for trial use primarily to control Johnsongrass seedlings and wild cane. It requires incorporation. As is true of most preemergence herbicides for soybeans, crop tolerance is not so good as might be desired.

Some preemergence herbicides for soybeans may occasionally injure the crop. But when you are deciding whether or not to use a herbicide, be sure to consider both the possibility of crop damage from the herbicide and the probability of yield loss from weeds.

For additional information, obtain a copy of Circular 856, "Weed Control in Field Crops," and the 1965 supplement from your county extension adviser or from the Information Office, University of Illinois College of Agriculture, Urbana, Illinois.

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April 1, 1965

JOHNSONGRASS AND MAIZE DWARF MOSAIC

No. 302

Johnsongrass is one of the important host plants for the new corn dwarf mosaic disease. This virus may overwinter in Johnsongrass and then be transmitted to corn. This threat calls for renewed interest in a vigorous Johnsongrass control program. Here are some methods that can help out if this pest is present on your farm.

Controlling small patches of Johnsongrass. Johnsongrass first appears as a few scattered clumps along roadsides, railroads, or fences, on waste land, or in fields. If not controlled, a clump may become a solid stand in a few years. The easiest way to keep Johnsongrass from spreading is to eliminate clumps or small patches promptly. Two materials are suggested for this purpose:

Atlacide. For clumps, use a cupful around the base of each clump. For patches, use 6 pounds per square rod. Be sure to treat far enough away from the plants to kill rhizomes creeping under the soil surface. Either use Atlacide in dry form or mix it with water and use as a spray.

Experienced operators may use sodium chlorate at the rate of 4 pounds per square rod. Sodium chlorate presents a fire hazard on flammable material such as clothing, hay, wood, or dry weeds. Atlacide contains sodium chlorate, but is less hazardous than sodium chlorate alone because it also contains calcium chloride, a fire retardant. Both sodium chlorate and Atlacide may sterilize the soil for a year or more.

Dowpon. Use at the rate of 1 pound in 5 gallons of water. Spray when the grass is between 1 and 2 feet high. Apply a second treatment three weeks later to kill any new growth. Dowpon acts through the leaves, so be sure to wet the foliage thoroughly with the spray.

Controlling solid stands after wheat harvest. One of the most practical times to control Johnsongrass is after harvest of winter wheat.

1. Let the Johnsongrass grow for 10 to 14 days after harvest.
2. Chop or clip the infested stubble.
3. Then let the grass regrow to a height of 12 to 14 inches.
4. Spray with Dowpon when the grass is actively growing. Use 8 pounds of Dowpon in 30 to 40 gallons of water per acre.
5. Fall-plow
6. Plant corn or soybeans the next season.
7. Use a pre-emergence herbicide to prevent the establishment of new grass from seed.

You can follow a similar program for reserve acres that are being returned to crop production.

Controlling Johnsongrass in the spring. Where corn or soybeans are to be planted, but Dowpon could not be applied the previous summer, take these steps:

1. Omit spring tillage and let the Johnsongrass grow about a foot high.
2. Spray with Dowpon, using 5 to 10 pounds in 30 to 40 gallons of water per acre.
3. Wait 7 to 10 days and then plow.
4. Wait two or three weeks before planting corn or soybeans, depending on how much Dowpon you use. This delay allows the Dowpon to decompose.
5. Plant corn or soybeans.
6. Use a pre-emergence herbicide at planting time to control seedlings.

Pre-emergence herbicides to use for controlling Johnsongrass growing from seed are Eptam for corn and Amiben for soybeans. Treflan and Vernam also appear promising, but since degree of crop tolerance is not yet well established, these latter two are suggested only for trial use in 1965.

Dowpon and the pre-emergence treatments mentioned above do not always completely eliminate Johnsongrass. Good cultivation will help to give further control, and spot treatments later can also be helpful.

These herbicides sometimes damage crops, but the damage is usually not significant compared with the yield reductions caused by Johnsongrass.

Several other soil sterilants are also available that have been satisfactory for use in railroad and other non-crop areas.

For a Johnsongrass control program to be most successful, cooperation is necessary between farmers, highway and railroad personnel, and anyone else who is responsible for infested areas. An increasing number of counties are appointing weed commissioners who have been doing a commendable job of emphasizing the educational approach to encourage control of Johnsongrass.

For more information obtain Circular 827, "Controlling Johnsongrass in Illinois," from your county extension adviser or from the Information Office, College of Agriculture, University of Illinois, Urbana, Illinois.

READ AND FOLLOW THE HERBICIDE LABEL.

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April 13, 1965

EARLY-PLANTED CORN PAYS OFF

No. 303

In most years, corn planted in late April or early May can pay off for Illinois farmers. But you'll need adequate populations, good weed control and high-quality, well-treated seed.

Recent University trials in Illinois and other corn-belt states point up the advantages of early planting. At Carbondale, for instance, U. of I. area agronomist Les Boone compared planting dates in tests run in cooperation with Southern Illinois University. He found that corn planted on April 15 and May 1 outyielded corn planted on May 15 by 15 percent in 1963 and by 25 percent last year.

Derrel Mulvaney, U. of I. area agronomist in northern Illinois, also tested planting dates at the Northern Illinois Research Center in DeKalb County. He found that May 4 plantings averaged 142 bushels per acre, eight bushels above corn planted on May 14. Plots planted in late May fell further behind, and a June 4 planting yielded only 105 bushels per acre.

Nearly all corn-belt states report similar results. In two-year trials in Indiana, Purdue researchers found that corn planted from May 7 to 9 brought in their highest yields, averaging 163 bushels per acre. This yield was 31 bushels better than corn planted on May 21. Corn planted on April 25 and 26 was 15 bushels below the May 7 to 9 mark. But this yield was still far above that for the late-planted corn. These results suggest that farmers planting large acreages should start planting well before the optimum date, since more yield was lost from planting too late than from planting too early.

Early planting brings several advantages. It permits you to grow full-season hybrids to take maximum advantage of your growing season. You also can plant your regular hybrids and then harvest earlier, when the weather is more likely to be favorable. Or you can use regular and full-season hybrids to spread your harvest. Early-planted corn is shorter, with lower ears, so its standability is generally better than that of late-planted corn.

Early planting also means earlier tasseling and pollination. This is the critical stage in the life of corn plants, the period when they most need adequate moisture. Early-planted corn will silk in mid-to-late July. Soil moisture usually drops as the season progresses, so you're more likely to have adequate water available in mid-July than in early August.

Plant enough seeds. With early-planted corn you need to pay closer attention to plant population, weed control, and seed quality. If you plant in late April or the first week in May, drop 20 percent more corn seed than you want in your final population. Corn germinating in cold soils may emerge and start growth slowly. Since the surface soil is warmer at this time of year, you'll also gain by shallow planting.

Control weeds. Research results show that it's the early weeds that start growing with the crop that hurt your yield. They can be particularly serious in early plantings. In past years it was these weeds that kept early-planted corn yields down. But now you can use such pre-emergence herbicides as atrazine, Randox, and Randox-T. These can control early weeds, so you gain the advantages of early planting.

Plant high-quality seed. High quality and good seed treatment are extremely important with early-planted corn. Look for high-germinating seed that's well treated. Most hybrid seed corn companies provide high-quality seed adapted for early planting.

What about frost? Occasionally a late frost may kill some or all of the above-ground corn seedling leaves. But corn plants usually survive, since the growing point is below the soil surface until the plants are 12 to 15 inches tall. The growing point will be only three to four inches above the ground when corn is knee-high. In case of frost, pull some plants and split them open to locate the growing point. Unless this shows damage, allow the field to recover. Your plants will already have extensive root systems, and they will take off again far ahead of any corn that you might replant.

Minimum tillage. Research has shown that corn does just as well--and often better--with greatly reduced soil tillage, particularly on fall-plowed ground. Less time spent in working the soil can allow you to plant earlier.

Starter fertilizer. Though starter fertilizer has seldom shown a yield increase where soil fertility is high, you may have more reason to consider its use to get very early planted corn off to a fast start.

New technology hastens change. Better seed treatment, improved hybrids, new herbicides, and higher populations all contribute to favor earlier planting. Bigger equipment and tractors bulging with horsepower make it possible.

Note one point: In most years you'll get an increase for early planting, but not every year. If extremely hot, dry weather should hit your planting at silking time, you may harvest less from early-planted corn. But year-in, year-out, you have to play the averages. And these now point definitely to early planting.

So in Illinois, if the weather is warm and your soil is ready the last of April, start planting. And by all means be ready to go with seed, fertilizer, pesticides, and equipment by May 1.

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AGRONOMY NEWS

crops and soils

No. 304

April 22, 1965

POSTEMERGENCE TREATMENTS FOR CORN AND SOYBEANS

Corn

Despite many excellent new chemicals now on the market, the old faithful post-emergence spray with 2,4-D is still one of the most economical and effective ways to control broadleaved weeds in corn. For best results apply while weeds are small and easiest to kill. Don't wait until the weeds are large, tough, and have already hurt your corn yields.

Suggested rates are 1/6 pound of low volatile ester, 1/4 pound of high volatile ester, or 1/2 pound of amine.

You can broadcast 2,4-D over the top of corn until it is about 8 inches tall. Above that height you should use drop nozzles. If you direct your drop nozzles toward the row be sure to adjust the amount of 2,4-D accordingly so that the rate you actually get on the corn does not exceed rates indicated above.

A fine spray droplets of any form of 2,4-D can drift and damage nearby susceptible plants such as tomatoes. The esters present more of a problem since they can volatilize, forming vapors which can travel further than spray droplets. The less-volatile amine form is safer - but take care with any form of 2,4-D to avoid damaging susceptible plants.

Although postemergence application of 2,4-D has been a big help in controlling broadleaved weeds, it does not control grasses. What can you use where grass weeds survive a preemergence herbicide, rotary hoeing, and cultivation?

Lorox may help out in some cases. You can apply Lorox after corn is 15 inches tall - and when weeds are six inches or less. As weeds become larger Lorox is less effective. If your stand is uneven and some corn is less than 15 inches, it may be injured. Lorox should be applied carefully as a diverted spray to keep it off the corn as much as possible - to avoid injury. Use of Surfactant WK improves the effectiveness of Lorox.

The use of Lorox is not an ideal control measure - but it sometimes can be helpful. When it works, you can get rather quick kill of weeds. However, your best bet is to put your emphasis on early control measures - preemergence herbicides, rotary hoeing, and row cultivation.

Dowpon has label clearance for use as a directed spray in corn. Cost of 2/3 pound of Dowpon plus 2,4-D as a directed spray over the row would be relatively low. Dowpon does not always kill grass weeds but may stunt and malform the grass

and decrease production of weed seed. This herbicide is translocated or moved inside the plant. This can help to control weeds but may also increase the possibility of corn injury. Use of leaf lifters and other precautions to keep the spray off the corn as much as possible can help to reduce the chance of injuring corn, but we would prefer treatments with less possibility of corn damage.

Soybeans

4-(2,4-DB) is sold under the trade names Butoxone SB and Butyrac 175. It has given fairly good control of cocklebur and some control of annual morning glory. However, research and field results indicate that it may sometimes cause splitting of soybean stems, increase lodging, and lower yields. The effect on soybeans seems to vary depending on stage of growth when treated. Other factors such as weather and growing conditions may also affect results. Current research is aimed at finding the most desirable stage of growth for treatment. For the present, we suggest 4-(2,4-DB) for trial use only for very serious cocklebur and morning glory problems - where your weeds are so serious that you are willing to risk damaging your soybeans.

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AGRONOMY NEWS

crops and soils

May 5, 1965

1965 AGRONOMY FIELD DAYS

No. 305

Mark your calendar now for the Agronomy Field Day nearest you. We're planning 19 of these events this summer to bring you the latest results at Agronomy research centers and experiment fields throughout the state. See the complete list on the reverse side of this page.

Featured at these Field Days will be the fine-looking gentlemen below, your area agronomists. Each manages the research fields in his area of the state, and carries out research programs to help answer your local crop production and soil management problems. In addition they give us lots of help in winter extension meetings. Chances are you've already met one or more of them.



On the left is Derreld Mulvaney, area agronomist in northern Illinois. He heads up the Agronomy Research Centers at Shabbona in DeKalb County and Elwood in Will County - as well as the Agronomy Experiment Field at Dixon. Derreld combines long experience, good judgment, and a thorough knowledge of northern Illinois soils and how to wrestle top yields from them. Stop in and visit Derreld this summer at one of his field days.

Next to Derreld is Gene Oldham, who leads the research at western Illinois experiment fields at Carthage, Clayton, Aledo, and Kewanee. Gene hasn't been with us long, but he's already performing like a veteran. Here's a young man on the move that you'll benefit from getting to know.

The third gentleman from the left needs no introduction to farmers in southern Illinois. In his many years of service Pat Johnson has done more to improve southern Illinois agriculture than any man alive. Pat Johnson is now in charge of the Agronomy Research Center at Brownstown, as well as experiment fields at Newton, Toledo, and Oblong. "Pat Johnson days" have long been favorites of southern Illinois farmers. You'll enjoy a meeting with Pat--for his thorough knowledge and long experience with the soils of his area--as well as his sincere

Les Boone, on the right, takes leadership in southern and southwestern Illinois, with experiment fields at Carlinville, Ewing, and Dixon Springs. Les also cooperates in research at the experiment field at Carbondale operated jointly with Southern Illinois University. Les stands second to none in his knowledge of the soils of his area, and cropping and fertility practices to get the most from them. If you haven't met Les, and you farm in his area, make this the summer to get acquainted.

If we sound proud of these men - you're right, we are. And we believe that you will be too. We hope you'll get better acquainted this summer. After all, it's you they're working for.

1965 Agronomy Field Days

<u>Date</u>	<u>Field</u>	<u>County</u>	<u>Starting time</u>
June 10	Brownstown Research Center	Fayette	9:00 a.m.
June 14	Newton	Jasper	1:00 p.m.
June 15	Carthage	Hancock	7:00 p.m.
June 17	Urbana (Agronomy Day)	Champaign	9:00 a.m.
June 30	Hartsburg	Logan	1:00 p.m.
July 1	Northern Illinois Research Center	DeKalb	1:00 p.m.
July 29	Carbondale (In cooperation with Southern Illinois University)	Jackson	1:00 p.m.
August 30	Kewanee	Henry	6:30 p.m.
August 31	Ewing	Franklin	1:00 p.m.
September 3	Brownstown Research Center	Fayette	9:00 a.m.
September 7	Aledo	Mercer	1:00 p.m.
September 8	Oblong	Crawford	1:00 p.m.
September 8	Carthage	Hancock	1:00 p.m.
September 9	Clayton	Adams	1:00 p.m.
September 9	Newton	Jasper	1:00 p.m.
September 10	Toledo	Cumberland	1:00 p.m.
September 14	Carlinville	Macoupin	6:30 p.m.
September 15	Dixon	Lee	1:00 p.m.
September 16	Elwood Research Center	Will	1:00 p.m.

Come and bring your friends. You'll see and hear the latest and best in crops and soils research.

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AGRONOMY NEWS

crops and soils

May 13, 1965

No. 306

CUT ALFALFA EARLY FOR HIGH YIELD AND QUALITY

If you grow alfalfa, you may find early cutting difficult this year because spring rains held up corn and soybean planting. Still, bud-stage alfalfa will pay off in higher yields and better quality than later cuttings. Research work from many states shows that you lose in several ways when you delay harvest until alfalfa blooms.

First you lose digestibility. Research results from New York, Maryland, Minnesota, and elsewhere indicate that alfalfa and other perennial forage crops all lose roughly one-half percent per day in digestibility as plants mature through May and early June. This means that alfalfa harvested June 10 will have at least 10 percent less digestibility than alfalfa cut May 20. The loss occurs in the field, and no matter how you harvest the crop you won't recover this lost percentage.

Protein is also falling while your plants stand in the field. Crude protein can often be above 20 percent in bud-stage alfalfa and slip to 15 percent as alfalfa passes into full bloom.

Meanwhile the fiber increases. Much of it is woody lignin, which is excellent in oak trees but indigestible for livestock. Lignin brings a triple problem. First, it takes up space in the animal which could hold digestible material. Second, it holds up the digestive process so that animals feel full longer and thus eat less often. Third, plants that have a high proportion of lignin are often tough and stemmy. Animals find them less palatable than the younger plants and they eat less of them.

Early-cut forage is therefore higher in digestibility, protein, and palatability and lower in lignin than forage cut later. Each of these things is important to your feeding program.

Taking off the first harvest early brings one advantage that is often unexpected. When alfalfa is harvested in mid-to-late May, normally the soil still has plenty of spring moisture and regrowth takes off rapidly. In a sense, you get spring growth all over again. In recent U. of I. tests, second-cutting yields--taken in mid-to-late June--have matched first-cutting yields. Farmers say they've had the same experience.

Years ago farmers had to treat alfalfa carefully to avoid killing out stands. But vigorous new varieties flourish under heavy management. They'll take early and frequent cutting and bounce back eagerly for more. Several of them have kicked out yields in the seven- to nine-ton range in U. of I. research plots and in farmers' fields.

What can these results mean to you in managing your harvest dates? It depends on your location in the state. In northern Illinois, strive for three alfalfa harvests, taking off the first before June 1 and the last by September 1. If you farm in central Illinois, harvest four times, starting on May 15 to 25 and finishing about September 7, to allow the alfalfa time to store root reserves for winter. In southern Illinois, start by May 10. Here five cuts are possible, although summer drouth will hold up growth in many years.

Early first harvest may compete with your corn and soybean planting or cultivating. But many farmers now plant corn and beans earlier and use herbicides to hold back the weeds. If alfalfa is an important part of your feeding operation, consider the feed value you can gain from bud-stage alfalfa that you will lose if you harvest too late.

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crops and soils

June 1, 1965

No. 307

AGRONOMY FIELD DAYS

Several Agronomy Field Days are coming right up. Chances are that one of them will be near you. Here's a rundown on what you'll see:

June 10: Field Day, Brownstown Research Center, just South of Brownstown, Illinois, in Fayette County. Tours will leave continuously from 9:00 a.m. to 11:30 a.m. Lunch will be available on the grounds.

Pat Johnson, University of Illinois area agronomist, will show his latest results on soil fertility and management practices. You will also see side-by-side comparisons of new varieties of wheat, barley, and oats. Ellery Knake, extension agronomist, will also be present to show you his plots comparing Treflan and other new weed-killers.

Another feature you won't want to miss is new research with a dramatically different type of tillage equipment.

June 14, 1:00 p.m.: Newton Experiment Field, Jasper County, Illinois. Pat Johnson will be in charge, showing you comparisons of soil fertility practices as they apply to Cisne soils. You'll also see the latest in wheat varieties and hear new developments in other phases of crop production and soil management. If you farm near Newton, this can be an afternoon well spent.

June 15, 7:00 p.m.: Carthage Field Day, Hancock County, Illinois. In a twilight meeting, Gene Oldham, western Illinois area agronomist, will team up with Ray Rendleman, Hancock County farm adviser, and Tom Haining, assistant farm adviser, to show you new comparisons of profit-making cropping practices. You'll see new varieties, fertilizer trials, and special demonstrations. Ellery Knake, will also be present to show comparisons of Treflan and other new herbicides. If you farm in western Illinois, you won't want to miss this meeting.

June 17: Agronomy Day, Agronomy South Farm, Urbana. This is the big one. We'll bring you complete details in the next issue of Agronomy News.

June 30, 1:00 p.m.: Hartsburg Field, Logan County. Larry Miller will lead this tour, sharing with you his long experience in working with the black soils of central Illinois. You'll see many comparisons of fertility practices, varieties, and cropping systems. You'll be particularly interested in Larry's plots where he has grown continuous soybeans for 12 years - and how they compare with nearby plots with more conventional cropping systems.

July 1, 1:00 p.m.: Northern Illinois Research Center, just north of Shabbona in DeKalb County. This field day gets more popular each year. This summer we're expecting more than 400 farmers. Featured stops include fertility trials with corn, soybeans, oats, and alfalfa; and variety comparisons of oats, wheat, and alfalfa. Of particular interest this year are studies with the new sorghum-sudangrass hybrids. Another eye-catcher is the "shooting the moon with oats" trial that last year produced over five tons of dry matter per acre in the seeding year.

Featured speakers will include University of Illinois area agronomist Derreld Mulvaney; extension specialists Bill Pardee, Roland Weibel, and Ellery Knake; oat breeder C. M. Brown; forage breeder C. N. Hittle; and others. Soil specialist Ed Runge will be present to show his soil sampler, which now permits us to extract samples from 4, 8, or even 12 feet deep in the soil that used to take days of digging to get. You'll see how this equipment helps us - and you - to understand why some soils yield more than others and what their yield potential may be. If you're buying land - or farming it - you'll find this a valuable stop.

There will be other field days in the late summer. You'll find them listed in Agronomy News 305. We'll bring you further details on them in a future issue.

We hope you can join us at one or more of the field days listed above. We'll be looking forward to visiting with you.

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June 11, 1965

COME TO AGRONOMY DAY - JUNE 17

No. 308

June 17 is the date for this year's Agronomy Day at Urbana. We're planning a big day, so we hope you'll visit us on the Agronomy South Farm. Tours will leave continuously throughout the morning, starting at 8:30 a.m. We'll have lunch and refreshments available. Come anyway if it rains - we will hold the program in the Stock Pavilion.

Here are the program highlights:

1. Are narrow-row corn and soybeans for you? We've gathered a panel of experts to bring you the over-all picture. If you're considering a switch to narrow rows, here is your chance to get the whole story before you make your decision.
 - a. The Agronomist's View. Specialists W. O. Scott and Gene Oldham will discuss what narrow rows can do for you - and what they can't.
 - b. The Agricultural Engineer's View. Wendell Bowers will show the equipment changes that are necessary, together with what they may cost.
 - c. The Agricultural Economist's View. Royce Hinton will discuss narrow rows from the overall farm management viewpoint.
2. Early Planting of Corn: Johnny Pendleton's at it again. Several years back he upset tradition by planting soybeans and corn in narrow rows. Now he's casting a questioning eye at the time we usually plant corn. Johnny started planting on April 19 this year, and he's been planting at intervals ever since. His early-planted corn looks first-rate, even though he froze some of it back with dry ice to simulate frost. Johnny has some new ideas here that you'll want to see. Don't miss this one.
3. Herbicides for Soybeans: Fred Slife and Lloyd Wax will discuss the best chemicals available to control weed pests that cut your soybean profits. Several new developments show promise.
4. Weed Control in Corn: Ellery Knake and Marshal McGlamery will team up to bring you the latest ways to grow a "clean" field of corn. You'll see results of new herbicides - as well as novel chemical mixtures that may be killing Illinois weeds in years to come.
5. Nine-Ton Alfalfa in Illinois! Impossible? Not at all. You'll see plots that did just that last year. Forage specialists Hittle and Jackobs will tell you how they did it and which varieties they used. If you grow alfalfa, here's one stop you won't want to miss.
6. Soybean Varieties: What's the latest on the new variety, Wayne? What else shows promise? Soybean breeders Bernard and Hadley will show you the newest and the best.

7. Sorghum-sudangrass hybrids are coming of age and finding use on many Illinois livestock farms. Forage specialists Tom Burger and Dave Gilchrist will discuss varieties, pasture tips and other management information.
8. Maize Dwarf Mosaic: Plant pathologist Mal Shurtleff will bring you up to date on this dangerous disease that stunted corn in southern Illinois last year - including where it is, what it is, and what is the best way to control it.
9. Wheat Varieties and Fertilization. You'll see top varieties compared under conditions of low and high fertility. How much nitrogen can Monon take, or Ottawa, or Gage? Wheat specialist R. O. Weibel will join area agronomist Les Boone in this eye-opener.
10. Improving Corn Protein? Can we develop corn hybrids that will produce grain containing enough balanced protein for hogs and poultry? Corn breeder D. E. Alexander thinks we can. This may be the most important stop on the tour for its long-term impact on corn-belt agriculture.
11. Fertilizer Facts: How much fertility are you removing from the soil in high-yielding crops - and how much must you return? Soil fertility specialist Fred Welch will give profit-making pointers that you can put to good use in your farm planning.
12. The Worm's-Eye View: Soil specialist Ed Runge has a soil sampler that quickly reaches 4, 8, and even 12 feet into the soil to extract profile samples. Ed will show this machine in action and explain how it can help to better evaluate the yield potential of our soils - by seeing what they're like down deep. If you're thinking of buying land - or farming it, you'll find this a valuable stop.
13. The Insect Outlook: Entomologists H. B. (Pete) Petty and Steve Moore will discuss current insect problems and controls. Here you'll get up-to-the-minute information that you may be able to put to use as soon as you get home.
14. New Oat Varieties are also here. Brave, a new University of Illinois release, was developed by C. M. Brown, who will discuss oat varieties and methods of wringing top yields from your oat crop.
15. The South Farm - The Past 30 Years: We're usually trying to open the blinds to peer into the future. But once in a while it's fun to look back. C. H. "Dusty" Farnham, long-time manager of the South Farm, may soon be retiring - so we've asked him to tell a few tales from the past.

There's the Preview: Come to Agronomy Day and bring your neighbor. We're looking forward to visiting with you.

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crops and soils

July 19, 1965

No. 309

HARVESTING SORGHUM-SUDANGRASS

Sorghum-sudangrass and sudangrass can produce high yields of quality forage--but proper management is a must. Here are some tips drawn from university test trials and farmer experience.

First, you'll usually find that both sudangrass and the new sorghum-sudan hybrids will fit best into your summer feeding programs. They can kick out high yields of pasture, green-chop, or low-moisture silage to tide you over until fall. But both forages are less desirable for winter feed. They're difficult to dry for hay. And they're too high in moisture for direct cut silage if you cut early. Neither will they match the energy content of corn silage if you cut late.

However, as pasture crops, these annual grasses really shine--and they'll pay off with a bonus for good management.

It's best to fence off your field into about three areas. Then graze these in rotation. Plan to pasture each section hard for a week to ten days, then move your cattle on. For best regrowth, clip the remaining stubble ⁴ to 5 inches high right after you pull out your animals. By promptly removing this old material you'll stimulate new tiller formation and rapid regrowth.

Frequent harvest can decrease your yield but increase your quality. In Illinois trials, agronomists have found that sorghum-sudans yield best with two or three harvests per season. More frequent cutting dropped yields by several tons, but increased protein content. Sudangrass performed better under four and five cutting systems than the sorghum-sudan hybrids.

Nitrogen top-dressing just after each cutting can increase yields and boost protein content. New growth 30 to 40 inches tall can be 18 to 19 percent in total protein if it is well fertilized, but it can fall far below this if it's nitrogen short. The best rate is probably about 50 pounds of actual N per acre. If severe drouth is holding up growth you may decide not to apply this extra nitrogen, since it may tend to increase risk of nitrate toxicity.

After harvesting sorghum-sudan, it's best to let regrowth get at least 18 inches tall before grazing or green-chopping. Laboratory tests suggest that new shoots can sometimes contain enough prussic acid potential to be risky. There's no danger in taller material, except for the first week following a frost. Piper Sudangrass is so low in prussic acid, it's probably safe under all conditions. Don't be overly concerned about prussic acid. Animal deaths have been extremely rare in Illinois and neighboring states.

Hay-making is difficult with both sorghum-sudan and sudangrass, but if you need additional hay badly, you can give this a try. Be sure to cut them while they are still short, 30 to 40 inches at the most. Taller material will be thick-stemmed and hard to dry. A hay conditioner--crusher or crimper--is almost a must, even on short growth, to crack the stems and speed up drying. Even with these steps, you'll need three to four days of good drying weather.

Low-moisture silage or haylage is another possibility. Here again, you'll get highest quality by cutting the crop relatively early and conditioning to speed drying. This way you'll get the crop out of the field sooner with less risk of rain.

Making direct-cut silage is another choice, but it presents problems. If you chop these grasses while they are immature, you'll find they are too high in moisture to make good silage. If you wait until the grain is in the dough state, the crop will be dry enough to ensile, but you'll have lower protein content. And your silage will be well below good corn silage in digestible energy since it will contain far less grain.

In past years many Illinois farmers have been pleased with their sudangrass and sorghum-sudangrass crops. Others have been disappointed. With both sudangrass and sorghum-sudangrass, as with any other crop, good management is often the key to success.

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crops and soils

August 11, 1965

SUMMER FORAGE SEEDINGS

No. 310

Are you considering a late summer seeding this year? If so, you'll gain these advantages: First, you'll avoid competition from a small-grain companion crop. You'll also have less trouble from weeds. And once your forage plants are established, they can go on to produce top yields the next year.

You may find disadvantages, too. Lack of moisture can be a real problem, particularly in southern Illinois. And you'll favor the grasses in the mixture, since grasses grow faster than legumes in cool fall weather.

For best results, seed by September 1 in northern Illinois and by September 15 in the southern part of the state. Keep the seed in the top half inch of soil. Roll to provide a firm seedbed and to firm the soil around the seed. There are several seeders on the market that roll and seed in one operation. If you don't usually roll your seedings, try it and leave a strip through the field unrolled. Unless moisture conditions are ideal, you'll see the difference.

Check your fertility level. For top yields, you need husky, well-fed plants. Chances are that you'll need to supply phosphorus, potassium, or lime, or possibly all three. So test your soil before seeding alfalfa.

Use vigorous new alfalfa varieties. They'll boost chances for good stands. They become established faster than the older varieties, and they'll give you more tons of forage per acre next year. New alfalfa varieties fall into two categories: fast growers like DuPuits, Alfa, and FD-100 for short-term stands, and wilt-resistant varieties like Vernal, Buffalo, Cody, Progress, Cayuga, WL 202, and 525 for either short or long rotations.

Which ones are best suited to your farm? It depends on how you use alfalfa. DuPuits, Alfa, and FD-100 will give you top production if you leave alfalfa down only one or two years and can harvest before June 1 (May 15 in southern Illinois). Vernal and the other wilt-resistant varieties are better bets if you can't harvest that early or if you want long-term stands. They mature later than DuPuits and will be less stemmy if you must delay harvest into June. Cody resists the spotted alfalfa aphid, a western pest that has moved into some areas of southern Illinois during the past few years. Cody is an excellent choice for southern Illinois farmers this year.

If you plant a large acreage, you may want both early- and late-maturing types. DuPuits, Alfa, or FD-100 will give you top yields for early harvest, while Vernal and other late-maturing varieties can spread your harvest season.

You may pay one to two dollars more per acre to seed one of these new varieties. But you can increase your forage yields by one-half to one ton of dry hay per acre per year. Where else can you get a bigger return on your investment?

DR. FRED SLIFE NAMED ASSOCIATE HEAD
Department of Agronomy

We're pleased to report that Dr. Fred M. Slife has recently been named associate head of the Department of Agronomy for a two-year term. Fred's main job will be to oversee the vast research program of the department. He'll also help Dr. M. D. Thorne, department head, select new graduate students and handle other administrative details.

In recent years Fred has headed up big research programs of his own, seeking better ways to control weeds. He has also taught courses in weed control and worked with numerous graduate students in this field. He has always kept busy, but he'll really be hopping now, as he plans to keep his hand in both research and teaching while carrying on his new responsibilities.



Fred is a native Illinois son who stayed home and made good. Raised in Milford, he graduated from the University of Illinois in 1947 and earned his Ph.D. degree in 1952. Not willing to let such a good man escape, University of Illinois administrators nabbed him before he could get away--and he's been with us ever since.

Fred is known throughout the nation as a leader in the field of weed control. He serves as permanent secretary of the Weed Society of America, a fine testimonial to his standing among his colleagues. Many of his students are now working in weed control on both industry and university staffs. Fred and his wife, Eleanor, have four children ranging from 9 to 16 years.

An extension program is only as strong as the research on which it is based. In the past, Illinois agronomists have continually backed up their extension efforts with top-flight research. With Fred Slife joining M. D. Thorne in this new role, we're sure that this cooperation will continue.

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AGRONOMY NEWS

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August 19, 1965

HAS THE NITRATE PROBLEM BEEN OVERRATED?

No. 311

In recent years you've heard a great deal about the dangers of nitrate poisoning of cattle, particularly with corn silage. This risk has been greatly exaggerated. We do not know of any proven cases of nitrate poisoning from corn silage east of the Mississippi--in spite of high nitrogen fertilization and local drouths. Despite the scare caused by last year's drouth in southern Illinois, the State Diagnostic Laboratory at the U. of I. College of Veterinary Medicine reports that there were NO confirmed cases of nitrate poisoning due to corn silage in the state in 1964.

It's true that farmers in states farther west occasionally lose cattle from nitrate poisoning in years of severe drouth. But the problem there comes from letting cattle graze stalk fields without any grain to supply energy to counterbalance the nitrates. Stalk fields are rarely, if ever, a problem in the central and eastern corn belt, since fall rains wash most of the nitrates from the stalks, often before harvest. And a drouth by Illinois standards is not severe compared with the drouths that occasionally occur in Kansas, Colorado, or Nebraska.

In the few cases of confirmed nitrate problems in Illinois, the water supply has generally been at fault. Drainage from feedlots or manure piles washes into poorly located wells or seeps through cracked casings, raising the nitrate content.

To better understand the role of nitrates in the field, let's look at the corn plant and see how it operates. Corn roots pick up practically all their nitrogen in the form of nitrates. These nitrates move up the stalk and into the leaves, where the plant uses them to build proteins. Fast-growing plants need nitrates in their systems and use them rapidly. As corn plants reach maturity under normal growing conditions, their nitrate content gradually falls almost to zero.

Nitrates can build up in the lower stalk of the plant if growing conditions are unfavorable and there is a plentiful supply of nitrates in the soil. These nitrates can come from many sources, including plowed-down legumes, heavy manure applications, high levels of soil organic matter, or recent nitrogen applications. Drouth is the most common stress that causes mild nitrate buildup, but high populations, barren stalks, or long periods of cloudy weather can contribute to it. Shortages of other plant nutrients can also hold back growth, allowing nitrates to accumulate.

The trigger seems to be the enzyme that's called nitrate reductase. It converts nitrate to nitrite in the corn leaves, starting the nitrogen on its way toward protein. Drouth, crowding, and other growth-limiting factors slow down nitrate reductase activity. And with this slow-down, nitrates accumulate in the stalk. Even so, the level has not been high enough to be dangerous to animals under Illinois conditions.

Though drouth can cause some nitrate buildup, this accumulation is usually not so great as is thought. Let's look at what happens in a drouth. As the soil dries out, nitrates tend to move upward in the soil water and concentrate near the soil surface as the water evaporates. Meanwhile the corn roots are going deeper and deeper to reach moisture. As a result, the corn crop is often short of nitrates under drouth conditions. Much of the firing of the lower leaves usually associated with drouth is actually due to nitrogen deficiency. As the soil dries out, the plant's supply of nitrates also dries up. Some nitrates may be present in the stalk--but not enough to be harmful.

There are two exceptions that can cause trouble. The first is in old feedlots, where the deep subsoil (often 10 feet deep and more) has accumulated high levels of nitrates. Here corn roots can continue to get plentiful nitrates even in a drouth, and levels may be high in the stalks.

A good rain following a long dry period can also raise stalk nitrate levels. In this case the nitrates concentrated near the soil surface are swept into the roots along with the water. The high nitrate content will be temporary, and the nitrates will decline within a few days as the plants resume active growth.

The danger of "silo gas" has not been overrated. Several farmers have died and others have become ill from poisonous gases generated by nitrates in silos. Poisonous yellow and brown gases may form in a newly filled silo and below the chute if the nitrate level is high. But don't wait for this warning. As a safety measure, always run the blower 10 to 15 minutes before anyone enters a silo during the first three weeks after filling. Running the blower for a few minutes each day will prevent livestock from being affected by gases that form in the silo and flow down the chute.

How do nitrates affect the vitamin A supply of livestock? A few years ago it appeared that nitrate in silage interfered with the use of vitamin A. Further research has failed to show any consistent relation between nitrates and use of vitamin A by cattle and sheep. You can feed vitamin A for only a few pennies a day. So your best guide is to fertilize for high yields and provide recommended levels of vitamin A in your cattle-feeding programs.

W. D. Pardee
Extension Agronomist

S. R. Aldrich
Extension Agronomist

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August 20, 1965

FALL FIELD DAYS COMING UP!!

No. 312

A wide-ranging series of Agronomy Field Days is coming right up. Here is a run-down of times, places, and featured research that you'll be able to see. Check fields nearest you and mark your calendar now.

Western Illinois. Gene Oldham, area agronomist, heads up four field days.

Kewanee Experiment Field, Henry County, August 30, 1:30 p.m. Loaded with research, this field features high fertility rates for corn, soybeans, and alfalfa, including special nitrogen comparisons on corn and oats. You'll also see narrow-row corn and beans, as well as soybean varieties. Livestock men won't want to miss alfalfa and grass plots that will yield over 8 tons of hay this year. U. of I. Henry County farm advisers Darl Fike and Hugh Ross join Gene Oldham in planning this day, aided by farm advisers from nearby counties. University of Illinois agronomist Johnny Pendleton will join in making this a tip-top event for area farmers.

Aledo Experiment Field, Mercer County, September 7, 1:00 p.m. Here Gene Oldham, Mercer County farm adviser Chuck Englehart, and agronomists Johnny Pendleton, Ed Runge, and Fred Welch will be on hand. You'll see plots testing "hi-hi" rates of fertilization, up to 240 pounds of N, and top levels of other nutrients, to find how high you can go--with profit--in the years to come. And there'll be fertility studies of continuous corn and two rotations, one for livestock--with hay included--and the other for cash-grain farmers.

Carthage Experiment Field, Hancock County, September 8, 1:00 p.m. Here Gene Oldham and U. of I. Hancock County farm advisers Ray Rendleman and Tom Haining will join agronomists Larry Miller and Fred Welch. You'll see tests with various rates and ratios of starter fertilizers on corn, soybean variety trials, weed control plots, and a wide range of fertility trials on cropping sequences adapted to western Illinois.

Clayton Experiment Field, Adams County, September 2, 1:00 p.m. Here you'll find Gene Oldham and Larry Miller joining Ron Dedert, U. of I. Adams County farm adviser. Featured will be high N rates, up to 240 pounds per acre. Chances are that you'll be thinking of rates like this in a few years. Now's the time to see how they look. You'll also see narrow-row corn and a wide range of fertility studies on corn, soybeans, and hay.

Northern Illinois field days will be headed by area agronomist Derrel Mulvaney.

Wood Research Center, Will County, September 16, 1:00 p.m. Here's an event that gets bigger every year. Starting from scratch five years ago, Derrel and farm manager Dick Taylor have developed a tip-top research center with many profit-making lessons for area farmers. For this field day they'll be joined by

agronomists Pardee, Pendleton, Aldrich, Scott, Hinesly, Knake, and Welch. With this line-up you'll hear the newest and the best on such topics as fertilizing corn and beans for top production and profit, soybean varieties, chemical weed-killers, narrow-row corn and beans, sorghum-sudangrass hybrids, pop-up fertilizers, etc. You'll be particularly interested in corn grown after minimum tillage methods ranging all the way from zero tillage to conventional, including many novel ideas.

Dixon Experiment Field, Lee County, September 15, 1:00 p.m. Derreld Mulvane and soils specialist Ted Peck will team up with U. of I. county farm advisers to show you the effects of tests of "hi-hi" nitrogen rates on corn, designed to find how high you can afford to go. You'll also see fertility trials of soybean and alfalfa, comparisons of cropping sequences, and other research aimed directly at Northern Illinois problems.

W. D. Pardee
Extension Agronomist

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FALL FIELD DAYS COMING UP!!

No. 313

(Continued from Agronomy News No. 312)

Agronomy News No. 312 gave information on Agronomy Field Days in western and northern Illinois. This issue includes similar information for south-central and southwestern Illinois.

South-Central Illinois. Here Pat Johnson will present four important events.

Brownstown Field Day, Fayette County, September 3. Tours leave throughout the morning, starting at 8:30 a.m. On hand will be U. of I. agronomists Pardee, Knake, Aldrich, Runge, and Weibel and farm advisers from nearby counties. You'll hear new results on fertilizing corn and soybeans, see tests of soybean and corn varieties and sorghum-sudan hybrids, and hear results of 1965 wheat variety trials. Fayette County farm adviser J. B. Turner will show corn grown after some drastic new tillage practices. Lunch will be available.

Oblong Field Day, Crawford County, September 8, 1:00 p.m. Here agronomists Pat Johnson and W. O. Scott will team up with U. of I. Crawford County farm adviser Boyd Lahr to bring you the newest in fertility research, soybean and wheat variety results, and studies to find the most profitable levels of nitrogen to use.

Newton Field Day, Jasper County, September 9, 1:00 p.m. Pat Johnson and farm adviser Jim Brooks will present new tests with "hi-hi" rates of nitrogen to find what levels will pay in the years ahead. You'll also see the latest on soybean varieties and fertilization. One new feature is Treflan used with other chemicals for complete weed control--with no cultivation.

Toledo Field Day, Cumberland County, September 10, 1:00 p.m. Here Pat and U. of I. Cumberland County farm adviser John Slayton join forces to bring you new results of nitrogen and other fertilizer studies of corn, beans, and wheat. You'll also hear what's new in soybean and wheat varieties.

Southwestern Illinois. Here area agronomist Les Boone has a big evening set up.

Marlinville Field Meeting, Macoupin County, September 14, 6:30 p.m. Les, Ed Runge, and Macoupin County farm adviser Orville Mowery will show new research, including "hi-hi" nitrogen rates, studies with micronutrients, and minimum tillage with both corn and beans. You'll be particularly interested in fertilizer studies with continuous corn, continuous beans, and corn, bean rotations. This will be a top event in the fall schedule. Les says there's likely to be a crowd--so come early.

So there they are. We're putting a great deal of effort into these field days to bring you the latest in crops and soils research. Come to see us--and bring your friends.

W. D. Pardee
Extension Agronomist

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September 10, 1965

TIPS FOR TOP SOYBEAN COMBINING

No. 314

Here are some tips for combining soybeans that may help you leave less beans in the field and deliver cleaner, uncracked beans to the elevator.

Before you start combining, check your operator's manual to be sure all settings are correct. If you don't have a manual, get one from your dealer. Repair, lubricate, and adjust your combine, using the operator's manual as your guide. Check particularly the concave, screen, and fan adjustments. A few hours spent in carefully adjusting your combine can often mean 2 to 5 more bushels of beans per acre.

The most important point to check is cylinder speed. Most combines call for a speed of 500 to 800 RPM for soybeans, but check your machine carefully and set it exactly as specified by the operator's manual--100 RPM too fast can cause beans to crack. Start combining at this speed and then check your beans. As beans dry out during the day, you may need to slow your cylinder speed down to avoid cracking. Soybeans may have 14 or 15 percent moisture when the dew is on in the morning and then drop to 11 or 12 percent in the afternoon of a hot day. If your beans are particularly dry and you cannot avoid cracking, you may wish to stop combining during the hottest part of the afternoon.

Also note the engine speed if yours is a self-propelled combine. Unless the combine is new, you'll probably find that the governor needs adjusting. Poor adjustment can throw your whole threshing operation out of kilter, leaving weed seeds and trash in your beans if it's too slow and passing beans out the back end if it's too fast. Your operator's manual will specify the proper engine speed at full throttle with no load.

Also check the concave clearance. If it is too small, you'll overthresh and have trouble in separating the trash. Normally 1/2 to 5/8 inch is sufficient, but check your manual to be sure of the setting for your machine.

Check your top screen. It should be wide open or nearly so, and the fan should be on full. Also be sure you have no whole, threshed beans in the tailings. They will certainly crack if returned and rerun through the cylinder. The tailings should contain unthreshed pods with no loose beans.

Once you're in the field, check the straw for unthreshed pods and for beans being carried out on the straw rack or over the rear of the top screen. You may need to make minor adjustments in the cylinder speed and concave clearance to get better threshing or to adjust the screen and sieve to get cleaner beans. Your beans will also be much cleaner if you use a soybean screen.

Soybeans dry fast in hot fall weather. Beans at 13 percent moisture can drop to 9 percent in a few days. Have your combine oiled, set, and ready to go before beans reach the proper moisture level. You'll crack far less beans at 13 percent than you will at 9 percent. Last year, many beans in southern Illinois reached 8 to 9 percent moisture before they were combined--and showed up later

as low-quality beans in the market. When beans get too dry, you lose in two ways--through cracking and through weight loss. On the other hand, it won't pay to combine beans above 13 percent, since they will need additional drying.

Here's a quick way to measure soybean losses in the field:

1. Make a light frame exactly one foot square.
2. Place it on the ground behind your combine, and count the beans within the square. To be sure you're accurate, make several counts across the width of the cut, some behind the platform and some behind the straw racks and sieves. Count three or four places in the field.
3. Count the number of beans, including those still in pods, and divide by four. That will give you the number of bushels per acre your combine is leaving.

If your losses are high, here are some hints for reducing them:

1. Drive slowly enough not to overload the cylinders and straw racks. Slower speed will also reduce the number of beans knocked off plants by your reel and sickle bar. Be sure to match your forward speed with the rate of flow of beans through your sickle bar to avoid stripping pods from the lower stems. On the other hand, don't go too slowly or you won't have enough plant material moving through to properly cushion the beans.
2. Cut low--below the lowest pods where possible.
3. Be sure the reel speed is just slightly faster than the ground speed. Adjust the height so that the reel will maintain a steady flow into the header. Use a pick-up reel for down beans, but not for beans that are standing well.
4. Recheck your cylinder speed and concave clearance.

Check the beans in the hopper. Cracked beans are usually due to (1) return of threshed beans with tailings, (2) too fast a cylinder speed, or (3) too small a concave clearance.

Look for a top man with a combine and you'll find one who sets his combine carefully, paying close attention to his operator's manual. You can earn a good many dollars per hour in beans saved during the short time it takes to get and keep settings right.

Wendell Bowers
Extension Agricultural Engineer

W. D. Pardee
Extension Agronomist

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September 14, 1965

No. 315

1965 WHEAT VARIETY TRIALS AND PLANTING SUGGESTIONS

High-yielding newcomers shared honors with popular favorites in the 1965 Illinois wheat variety trials. Tops among hard wheat varieties was Gage, a brisk newcomer from Nebraska. Gage really stood out at Urbana, yielding 61 bushels, 11 more than its closest rival. This marks the second consecutive year in which Gage has topped this test. Gage also filled hoppers faster than other hard wheats in 20 county demonstrations, averaging 53 bushels per acre. Ottawa also did well at 50 bushels, while Pawnee drifted behind at 47.

Resistant to Hessian fly, soil-borne mosaic, and loose smut, Gage should become a popular variety in Illinois, joining Ottawa to form a team of outstanding new hard wheats. Gage is about equal to Pawnee in straw strength, but it does not stand quite so well as Ottawa. Limited seed supplies of Gage will be available this fall.

Among soft wheat varieties, Vermillion and Monon shared top honors. In trials at Urbana and Brownstown, Vermillion outperformed other soft wheats, while Monon produced the top average in 20 county demonstrations. Knox 62 also did well in southern Illinois and showed better winterhardiness than Knox in central areas of the state.

Several newcomers in the testing program showed promise, including Lewis from Missouri and still unnamed selections from Illinois and Indiana. Although they require further testing, one or more of them may find a place on Illinois farms.

After comparing these trial yield results with farmer experience, Illinois agronomists offer these tips for fall planting:

First, decide whether to grow a hard or soft wheat variety. South of Route 40, soft wheats consistently outyield hards, often by 10 to 15 bushels per acre. Returns from this extra yield more than make up for possible price differences between hard and soft market classes. In western and northern Illinois, it's generally best to grow hard wheat. In any part of Illinois, sow the type grown by the other farmers in the area. Most elevators aren't equipped to handle soft and hard wheat separately. And mixed wheat brings a lower price. New grain standards are much stiffer now than formerly. Much wheat that once passed for soft or hard may be discounted as mixed in coming years.

If you live in an area where all of the wheat is soft (or beardless), you'll benefit yourself and your neighbors by sticking to a soft wheat variety. The reverse is true if your area grows hard (or bearded) wheat. If farmers in your area grow both types, check with your elevator to find which it can handle.

For fall planting this year, R. O. Weibel joins extension agronomists W. D. Pardee and W. O. Scott in making the following suggestions:

In hard wheat, Gage and Ottawa are top choices. Pawnee has trouble in keeping up with these brisk newcomers, but still does reasonably well. Triumph fits in as a special-purpose variety for farmers who particularly desire early maturity.

In soft wheats, Monon, Knox 62, and Vermillion are all top choices. Monon's short straw and earliness have made it a favorite in southern Illinois. Vermillion also has a fine yield record and is slightly more winterhardy than Monon. Monon and Knox 62 both resist Hessian fly and can be planted before the fly-free date. Vermillion is not resistant to this pest, so it should be planted later.

If you are interested in fall grazing and then planting a good grain crop next spring, you may want to use Reed, a dual-purpose variety that resists Hessian fly and yields well. Reed is taller, leafier, and later than other soft wheat varieties. Its winterhardiness is adequate for southern Illinois, but not for northern areas of the state.

University of Illinois tests include many varieties not listed here. Others either have not made the grade or require further testing to insure their dependability. University of Illinois agronomists and farm advisers carry on these tests to help Illinois farmers find the best available varieties. For further information on wheat varieties, check with your county extension farm adviser. He represents the University of Illinois in your county and can help you pick the best variety for your farm.

W. D. Pardee
Extension Agronomist

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FALL FERTILIZATION--WHEN AND WHERE?

No. 316

This year you will hear a great deal about fall application of fertilizer, especially nitrogen. Fertilizer dealers cannot move the tremendous amount of plant food that Illinois farmers need in the short period before spring planting or sidedressing without charging higher prices than for fall-applied fertilizers.

Farmers can profitably apply phosphorus and potassium on all soils in the fall.
The main questions concern fall-applied nitrogen. Consider these factors in deciding whether to apply nitrogen this fall:

- 1. On medium- and fine-textured soils--silt loams and clay loams--leaching is usually a minor problem because:
 - a. Most of the nitrogen is applied in, or will change to, the ammonium form and will move little until after it changes to nitrate.
 - b. Ammonium compounds applied in late October and November will stay mainly in that form over the winter because the soil temperature will usually be below 50 degrees and will be falling two or three degrees a week in central Illinois, with temperatures cooler in the north and warmer in the south. Soil organisms that convert ammonium to nitrate continue to multiply until the temperature falls to about 32 degrees F., but their rate of growth slows greatly when the temperature falls to 40 to 45 degrees F.
 - c. The net amount of water available for downward movement is rarely more than 8 to 10 inches--1 inch penetrates about 6 inches--from November 1 to the following summer. This water will move nitrates a maximum of four or five feet.
 - d. In many soils, corn roots feed effectively at a depth of four or five feet. Soils in which nitrogen is likely to move deepest also have the deepest root penetration.
- 2. On sandy soils fall application is discouraged because each inch of water penetrates about a foot, so the net 8 to 10 inches available can readily move nitrates below the root zone. A grass cover crop helps to reduce leaching but will probably hold less than 40 pounds of nitrogen. This amount is not enough to make fall application safe at usual rates.
- 3. In early fall applications on fields that have a lot of residues, such as chopped stalks from 90- to 160-bushel yields, the nitrogen may be tied up by soil organisms when the residues decay. Thus it will be held against leaching or denitrification and will usually be available as needed in the following year. The efficiency with which this nitrogen can be used is not known. Later fall application seems a more reliable way to reduce losses.

4. Fall application assures that the nitrogen will be on the field before planting. Early spring application poses these hazards:
 - a. A wet spring may make it impossible to complete application before planting time. Since early planting favors high yield, planting should not be delayed in order to apply fertilizer.
 - b. Spring application on a wet field causes ruts that sometimes cause spreaders to be stuck in the mud.
 - c. Spreading anhydrous and aqua ammonia just before planting is risky unless the seed-fertilizer separation is at least five inches.
 - d. This year a few farmers found that, because the soil was wet after planting, they were unable to sidedress nitrogen before the corn got too large.
5. A fall application is likely to be no more susceptible to denitrification loss than a pre-plant application in the spring. Most of the fall-applied nitrogen should remain in the ammonium form over winter. If some nitrifies, the soil is not likely to be warm and wet enough for extensive denitrification. Some nitrate, if formed, would be held by microorganisms in the decay of residues (see 3 on preceding page).
6. In a few cases, fall application has important disadvantages. Nitrogen cannot be recovered if:
 - a. Farmers cannot plant, as in the Mississippi flood plain this spring.
 - b. Circumstances force a change in cropping plans and a farmer decides to plant soybeans or oats on a field where he applied a high rate of nitrogen with the intention of planting corn. Soybeans and oats make far less efficient use of nitrogen than corn.
 - c. Low spots in the field drown out.
 - d. Low spots have water ponded on them for a few days when the temperature is high. Most of the nitrogen, if already converted to nitrate, will be lost by denitrification.
7. In terms of efficiency with which nitrogen is used by corn under normal conditions, the ranking is: sidedressing, most efficient, followed by application just before planting, then early spring application and late fall application in fourth place. However, the differences will often be so small, except on sands, that other considerations listed under point 4 offset them.

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Soil Fertility Extension

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October 21, 1965

QUACKGRASS CONTROL TIPS

No. 317

Quackgrass is the most serious perennial grass weed in northern Illinois. A cool-season grass, it spreads both from seed and from underground stems (rhizomes). The straw-colored rhizomes creep along under the soil, sending up new shoots as they go.

But you no longer need to let "quack" bite into your yields. Results on test plots and in farmers' fields show that modern methods can control this pest. The key is atrazine. Fortunately, quack is very sensitive to atrazine. Corn, on the other hand, shows excellent tolerance to this herbicide.

You can use atrazine in several ways. Some methods give slightly better control than others, but the main point is to decide which treatment best fits your cropping sequence and time schedule.

When should you treat? The best time is fall or spring, when quack is making its most active growth. You can apply atrazine to quack in your corn or soybean stubble. Or you can put it on land that is being taken out of pasture, hay, or other uses and is going into corn in the spring. For fall treatment, try to apply the herbicide early enough to allow two to four weeks of active plant growth before the ground freezes.

How much chemical? Four pounds of actual atrazine (5 pounds of the 80% wettable powder) per acre has given good control. Be sure your sprayer is working properly, agitating the wettable powder well in the tank, and applying it uniformly on the field. Be sure not to exceed this rate. Don't overdose by lapping or covering the same area more than once. Shut off the sprayer in plenty of time when stopping or turning.

If the quackgrass is mostly in patches rather than in a uniform stand, spray only the patches. Four pounds of atrazine per acre is a relatively high amount. If you apply higher amounts or treat areas where there is no quack, the atrazine may damage small grains, soybeans, or vegetables on the field in later years. And don't use atrazine on lawns.

How about residues? Quack and corn help to decompose the atrazine. But, to be on the safe side, plant corn for two successive years after the atrazine application, and don't apply atrazine to the last year of corn before planting some other crop. Following these precautions will help you avoid a carry-over problem.

Fall treatment has given good results, and it allows more time for atrazine to decompose. However, if you prefer, you can apply the four-pound rate (5 pounds 80W) in the spring after quack has resumed active growth. Take the same precautions as with the fall treatment. Or you can split this spring application, applying two pounds of active atrazine (2 1/2 pounds 80W) per acre to the quack before plowing and another two pounds as a pre-emergence spray at planting time. This split application usually controls annuals better than the one-shot fall or spring treatment, and quack control has been almost as good.

Other chemicals can team up with atrazine to kill quackgrass. For instance, if you'd prefer to use lower rates of atrazine, you can apply one gallon of amitrole-T per acre in the spring to actively growing quack. Then plow 10 to 14 days later, plant corn, and apply atrazine as a pre-emergence at planting time.

Dalapon can also kill quack. There is little danger that dalapon will carry over in the soil when applied in the fall. But spring applications may damage corn unless you have four or five weeks of sufficiently warm, moist weather between application and planting.

Research now shows that you can control quackgrass. In fact, these treatments are among the most practical and effective of any modern weed control methods. Pick the one that fits your operation. You need not put up with quack any longer.

For further information on quackgrass control, obtain a copy of Illinois Circular 892, "Controlling Quackgrass in Illinois," from your county extension adviser or write to the Information Office, College of Agriculture, University of Illinois, Urbana, Illinois.

Ellery Knake
Extension Agronomist

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United States Department of Agriculture
University of Illinois
Urbana, Illinois

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AGRONOMY NEWS

crops and soils

October 27, 1965

No. 318

MARK NOW, CHECK LATER ON LOW-YIELDING SOIL SPOTS

Now is the time to mark those low-yielding spots in your fields--while their location is still fresh in your mind. Mark them while you're harvesting so that you can check back later to find out why they're not yielding up to par. Poor drainage, low fertility, thin topsoil, sandy spots, wet spots, and even "slick spots" can occur in Illinois fields. You can't beat all of these profit-robbers, but you can switch many over to money-makers by pinpointing and correcting the faults.

Wet spots are probably the most common problem, particularly where water ponds after spring and summer rains. Yields can be cut to nothing if the water stands long. This year these spots were common in east-central and northeastern Illinois. If you have spots like this, check them closely. Chances are that they need more tile. Or maybe there's a ditch that needs cleaning, deepening, or straightening. For sound advice on correcting drainage problems, check with your county extension farm adviser or SCS representative.

Nitrogen shortages occurred in spots all over Illinois this year--even in fields that had liberal nitrogen fertilization. You'll see this evidence most often in spots where water ponded. Here the nitrogen was lost into the air through the process called denitrification. This loss occurs in warm soil when water stands or saturates the soil for two or more days. Watch for such loss and be ready to side-dress additional nitrogen to counteract it.

Other spots, particularly on hilltops or sloping areas, may be short of topsoil due to erosion. Winter and spring rains washed away a lot of Illinois topsoil this year. If your topsoil is thin on slopes or tops of rises, you'll need to use more fertilizer to get good crop yields. And you'll need to prepare the soil more carefully, particularly if your subsoil is high in clay. The best way to fight erosion is to block it in the first place. Erosion always boosts the cost of farming, no matter what your subsoil is like.

High-calcium soil areas in central and northern Illinois call for extra phosphorus and potassium or an extra load of manure. Here you often have free lime in the soil surface--which ties up phosphorus and slows the release of potassium. If you think you have such areas, take separate soil tests from them. You'll probably need to apply extra amounts of phosphorus and potassium to get top yields. Row placement of phosphorus may pay off. Mark these spots and give them a little extra attention. They are potentially high yielders and should repay your efforts.

This brings up the importance of a good sample for soil testing. Be sure to take samples from low, high, wet, or other unusual spots, as well as the main parts of your field. Keep each sample separate and mark the source of each one on a field map. This process can pay off by cutting your fertilizer bill while increasing yields. Your high ground may need several tons of lime, while your low spots may already have enough or too much. Many times you have to use an average soil test for the whole field, but a specific picture of areas within the field can help you place your fertilizer where it will do the most good.

Drouthy spots also show up in many Illinois fields whenever moisture runs short. Here soils are either unable to hold much water, or their structure restricts rooting depth so that the plants can't get to water. Some sandy areas run out of water every year. In a few localities in Illinois, it has paid farmers to irrigate on sands. But irrigation equipment is expensive--and water can be too. So don't get into irrigation without figuring all the angles.

"Slick spots" and soils with "fragipans" are common in south-central and southern Illinois. These areas are drouthy because they restrict root growth. Slick spots are high in sodium, and they tend to shed water; while fragipans--the modern word for hardpans--are layers in the subsoil that roots can't penetrate. The only way we know how to increase root growth in these soils is with a good fertility program or heavy applications of manure.

Cloddy spots are another dollar-loser. They can occur in the spring if you get into a field too early. It's best to wait until all of the field is dry enough to work before starting tillage operations. Otherwise wet slabs turn into hard clods that make for thin stands and poor fertilizer uptake. Early planting generally pays off, but not if you end up with big spots full of clods in your field.

Harvest is a time of hurry. Fall rains may make it particularly so this year. But a few minutes spent in marking low-yielding spots for future checking can pay off in the years to come.

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AGRONOMY NEWS

crops and soils

November 8, 1965

FALL VS. SPRING PLOWING

No. 319

For the past two years Illinois weather has been ideal for fall plowing, and farmers have fall-plowed about half of the state's 14 million acres of corn and soybeans. But this year wet weather has held up corn and soybean harvest, and the chances are that you'll have less time than usual for fall plowing. Here are some tips that may help you use the time you have to best advantage by plowing where it will pay most.

Where you fall-plow will depend mostly on the soil type. For instance, on poorly drained soils that have a high clay and organic matter content, fall plowing is almost a must. In most years these soils are wet, and spring plowing causes "puddling." A "puddled" soil often needs several diskings to prepare a suitable seedbed. Such soils, at least those with a high organic content (6 to 7 percent), are easily tilled the next spring after fall plowing, since the alternate freezing and thawing causes granulating that breaks up the clods. Often all that is needed the following spring is one disking or cultivation to kill weeds just before planting.

If soils are poorly drained and low in organic matter--3 percent or less--it is usually best to leave them unplowed until spring. Here freezing and thawing after fall plowing may break up the soil granules so much that you will need to plow again next spring. Growing vegetation will help to dry these wet soils for earlier plowing next spring.

Since sandy soils are usually well drained and spring plowing is not a problem, leave these soils unplowed as long as possible to prevent excessive wind-blowing.

Fortunately, most Illinois soils are fairly well drained loam and clay loam. If you have these better soils, be sure to consider the amount of erosion you're likely to get from rain, melting snow, or wind. Fall plowing is risky on slopes greater than 2 percent, particularly on long slopes of 200 feet or more. On contour-plowed or terraced land, you can fall-plow slightly steeper slopes. But fall-plowing deep prairie soil with a 3 percent slope can easily increase soil losses by water erosion as much as one ton per acre unless you compensate by using adequate conservation practices. If next spring is dry, wind erosion may be serious on fall-plowed level land. A few days of winds with speeds of 20 miles or more per hour can remove several tons of your most fertile topsoil per acre. Leaving the fall-plowed land rough until just before planting will help to reduce wind losses.

If wind erosion has been a problem in the past, you can cut soil losses from one-fifth to one-half by leaving a buffer strip of unplowed land three or four rows wide at 80- to 160-foot intervals. The buffer strips should be as nearly perpendicular to the prevailing spring wind as possible. In Illinois, most of the

wind erosion is caused by southwestern winds in April and early May. When fall plowing is early, seeding spring oats on the land in the latter part of September will usually provide enough cover to protect the soil against wind erosion.

A fall-plowed catch crop or meadow can occasionally show a yield advantage when spring moisture is low. But in the long run it will probably pay to leave most legumes--not sweet clover--on the land into the spring to take maximum advantage of their nitrogen-supplying powers. If you plow legumes in the fall, plow as late as possible--when soil temperatures are low--to prevent rapid breakdown of plant tissue. Late plowing will help to reduce nitrification and loss of nitrates through leaching.

Don't expect a large increase in yields from fall plowing. Research results from plowing Drummer silty clay loam on the University of Illinois Agricultural Engineering Farm have not shown a significant increase in yield for fall over spring plowing.

The chances are that fall plowing will do one thing for you. It can help you spread out your labor load. Getting the job out of the way in the fall often lets you plant earlier the following spring. In some years early-planted corn shows a yield advantage, not due to fall plowing, but due to early planting made possible by fall plowing. However, many farmers are finding that they can get corn planted early by adopting one of the several minimum- or reduced-tillage systems. Some are even experimenting with no plowing at all on some of the deep loess soils.

Soil type and slope are the keys to whether to plow in the fall or spring. If you're in doubt, check with your county farm adviser about your soil type and its characteristics. Then make your decision.

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December 3, 1965

STORE HERBICIDES SAFELY

No. 320

With close of the harvest season and approach of winter, it's time to check your herbicides to see that they are properly stored. Be sure to store them in a safe place so that children, pets, farm animals, and irresponsible people can't get to them. Then lock the storage place. If you don't have a separate storage room, you might consider building a low-cost wire cage.

Don't store herbicides close to food, feed, fertilizer, or other chemicals, such as insecticides. Some herbicides are volatile, and contamination might occur. Also check for open or broken bags and containers. Then seal them or dispose of them. Be sure caps are tight on bottles and cans. Check for leaks and destroy any leaky containers.

Store herbicides only in the original containers. If the label is gone, dispose of the herbicide. If the label is not completely legible but you can tell what the herbicide is, ask your dealer for a new label. **DON'T STORE ANY PESTICIDE IN SODA BOTTLES, HONEY JARS, OR OTHER CONTAINERS THAT CHILDREN MIGHT RECOGNIZE AS CONTAINING FOOD OR DRINK.**

Store liquid herbicides, such as some of the 2,4-D concentrates and Treflan, at temperatures above freezing. If the basement is the only warm area, use some judgment about what materials to store there and how to store them. Although some herbicides are relatively nontoxic and are not very volatile, others might cause a real problem if a container should leak or break. Just a little 2,4-D escaping from a container in the basement might find its way to the living area of the home and damage your wife's house plants. And a broken jug of Radox in the basement could be mighty unpleasant company.

Freezing not only may break some containers, but can also cause some herbicides to crystallize or "salt out." Such frozen materials will sometimes go back into solution after adequate warming and agitation, but it's best not to let them freeze in the first place. The use of held-over herbicides that have been frozen and later thawed may in some cases explain the lack of weed control. Most dealers know the effects of freezing and thawing and provide adequate storage facilities. They also know what storage precautions to take with each specific material.

Store wettable powders and granular herbicides in a cool, dry place. The area doesn't need to be heated. But be sure that the containers are sealed and that the material doesn't get damp or wet accidentally. Also, don't store herbicides on oily floors.

When ordering your herbicides for next year, try to figure your needs closely enough to avoid having a lot to carry over and store.

Now is also a good time to make a safety check of your spray equipment and order needed new parts. Replace brass nozzle tips after each one has been used for spraying 100 acres. If you have four nozzle tips for band-spraying behind a planter, put on a new set of tips after you have planted about 400 acres. Studies show that not only does the hole in the nozzle tip increase in size with use and wear, but the uniformity of the spray pattern can change, causing uneven application. Nozzle tips cost little, so replace them as needed. Uneven spraying might affect weed control and could also increase the chances of crop damage when certain herbicides were used.

Be sure to have goggles, rubber gloves, and other protective clothing for handling herbicides if label directions indicate that such precautionary gear is necessary.

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December 6, 1965

WINTER BRUSH CONTROL

No. 321

If you have brush to kill on your farm, winter is a good time to do the job. You can clean out pasture and fence rows at a time when field work is slack. And with chemicals you can do the job without spending a long time in the cold.

Another big advantage of winter treatment is that there is less danger of chemical drift onto susceptible plants. But it's still a good idea to be particularly careful, even in winter, when spraying near orchards, shrubs, and ornamental trees. It is always best to spray when there is little or no wind. Be sure that your spray and drift hits only the brush you want to kill. Here are some tips from U. of I. weed specialist Ellery Knake that may help you.

Treatment With 2,4,5-T

For best results, choose the ester form of 2,4,5-T for winter treatment. It kills more species and is more effective on many species than either 2,4-D or 2,4-D and 2,4,5-T mixtures. Some woody plants are so resistant that even 2,4,5-T will not always give a complete kill the first time. You may have to follow up with another treatment the next year.

Basal Sprays for Small Trees and Brush

Use a basal bark treatment, spraying or painting the lower part of the tree trunk with a gallon of 2,4,5-T containing 4 pounds of active ingredient mixed with 25 gallons of kerosene, diesel oil, or fuel oil. This amount is the same as one pint in three gallons of oil.

The spray is most effective when the bark is dry. Be sure to completely circle the trunk and cover it thoroughly to a height of 15 inches above the ground. Apply the spray until it runs down the bark and begins to wet the soil. And here's a tip: mixing an oil-soluble dye or a little paint with the spray will help you mark the treated areas. One gallon of spray material will treat about 33 trees three inches in diameter or about 50 trees two inches in diameter.

Foliar and Basal Sprays for Dense Stands

For dense stands, you may be better off to use both foliage sprays during the growing season and winter sprays. You may find it hard to apply basal sprays to such stands because you'll have so many stems to treat. And foliage sprays are only partly effective in dense stands. So use a foliage spray to thin the stand, and then kill the remaining plants the next winter with a basal spray.

Cuts and Frills on Larger Trees

Use the cut-surface treatment for trees over four inches in diameter. They often have bark too thick for basal sprays to penetrate well. Apply the herbicide through cuts or frills in the bark. You can make a frill by ringing the trunk of the tree with overlapping axe cuts that penetrate the sapwood at least one-fourth inch. Fill these frills with the basal spray solution given on page 1.

Stump Treatment

Stump treatment helps to prevent regrowth. Apply 2,4,5-T soon after cutting. Again, use the mixture recommended for the basal bark treatment. Spray or paint the tops and sides of the stumps until the solution begins to run off.

Granules and Pellets for Brush Control

Dybar and Urab brush-killers are available as granules or pellets for soil treatment. You can apply them any time that the ground is unfrozen. Late winter or early spring applications usually give best results. Apply these dry materials in a circle halfway between the trunk and the outmost reaches of the branches, or the "dripline." Rain dissolves the herbicide and carries it down into the root zone. Do not apply this material near desirable trees, since their roots may grow into the treated area. To kill solid stands, you may want to use broadcast applications instead of making spot treatments.

Whenever you use a herbicide, be sure to read the instructions on the label and follow them carefully.

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crops and soils

December 28, 1965

CORN COUNT-DOWNS, WHERE AND WHEN!

No. 322

Coming your way soon are the Big 1966 Corn Count-Downs, jam-packed with newest information to help you get higher corn yields. Featured will be two days on corn growing practices, insecticides, herbicides, fertilizers, populations, row widths, and tillage methods. In many locations U. of I. Agricultural Engineers will join us for a third day to discuss new developments in equipment.

All meetings will start at 10:00 a.m. sharp and finish at 3:00 p.m. Locations and dates are listed below. At the time this was written, several meeting sites had not been settled; in these cases you can check with your county extension farm adviser for the location nearest you.

SOUTH-CENTRAL AND SOUTHERN ILLINOIS

<u>Town</u>	<u>Building</u>	<u>Agronomy</u>		<u>Agricultural Engineering</u>
Hillsgboro	Farm Bureau Hall	Jan. 5	Jan. 13	Feb. 2
Carlinville	Farm Bureau Hall	Jan. 5	Jan. 13	Feb. 2
Vandalia	Farm Bureau Hall	Jan. 5	Jan. 12	Jan. 19
Effingham	Ramada Inn	Jan. 5	Jan. 12	Jan. 19
Nashville	Grace Methodist Church	Jan. 6	Jan. 13	Feb. 3
Mt. Vernon	Community Church	Jan. 6	Jan. 13	Feb. 3
Lawrenceville	Moose Hall	Jan. 7	Jan. 14	Jan. 28
Carmi	Farm Bureau Bldg.	Mar. 1	Mar. 8	Mar. 15
Tamms	Tamms High School	Mar. 2	Mar. 9	Mar. 16
Belleville	Fishers Restaurant	Mar. 4	Mar. 10	
Marine	United Church of Christ	Mar. 4	Mar. 10	

CENTRAL ILLINOIS

Springfield	State Fair Grounds	Jan. 4	Jan. 11	Jan. 18
Jacksonville	Black Hawk Restaurant	Jan. 4	Jan. 11	
Taylorville	American Legion Hall	Jan. 4	Jan. 11	Feb. 1
Sullivan	Civic Center	Jan. 4	Jan. 11	Feb. 1
Bloomington	Weslayan University	Jan. 18	Jan. 25	
Champaign-Urbana	Illini Union (Agronomy)	Feb. 3	Feb. 4	Jan. 5
	Moose Hall (Ag. Eng.)			
Pekin	Contact farm adviser	Feb. 15	Feb. 22	
Mattoon	Burgess-Osborne Audit.	Feb. 18	Feb. 25	Mar. 4
Lincoln	Farm Bureau Bldg.	Feb. 17	Feb. 25	Feb. 25
Decatur	Contact farm adviser	Feb. 17	Feb. 25	Mar. 3
Paris	Farm Bureau Bldg.	Feb. 18	Feb. 25	
Danville	Danville YWCA	Mar. 4	Mar. 10	Feb. 25

WESTERN ILLINOIS

Jerseyville	Contact farm adviser	Jan. 6	Jan. 12	Jan. 20
Mt. Sterling	Farm Bureau Bldg.	Jan. 7	Jan. 14	Jan. 21
Pittsfield	Farm Bureau Bldg.	Jan. 7	Jan. 14	
Aledo	VFW Hall	Jan. 25	Feb. 1	Feb. 22
Monmouth	Farm Bureau Bldg.	Jan. 25	Feb. 1	Feb. 15
Lewiston	Farm Bureau Bldg.	Feb. 15	Feb. 22	
Cambridge	Farm Bureau Auditorium	Feb. 15	Feb. 23	Mar. 1
Carthage	Coop. Extension Center	Feb. 16	Feb. 23	Mar. 8
McComb	American Legion Hall	Feb. 16	Feb. 23	Mar. 2

NORTH-CENTRAL ILLINOIS

New Lenox	Francis 4-H Field	Jan. 20	Jan. 27	Feb. 4
Henry	Henry High School	Feb. 15	Feb. 23	Mar. 1
Pontiac	Contact farm adviser	Feb. 22	Mar. 1	
Eureka	Contact farm adviser	Feb. 22	Mar. 1	
Kankakee	Contact farm adviser	Feb. 23	Mar. 2	Mar. 8
Watseka	IOOF Hall or Watseka Theatre	Feb. 23	Mar. 2	Mar. 8

NORTHERN ILLINOIS

DeKalb	Farm Bureau Bldg.	Jan. 19	Jan. 26	Jan. 4
St. Charles	Fairgrounds	Jan. 19	Jan. 26	
Mt. Carroll	Contact farm adviser	Jan. 21	Jan. 28	
Dixon	Loveland Community Bldg.	Jan. 21	Jan. 28	
Elizabeth	Farm Bureau Hall	Feb. 16	Feb. 22	
Freeport	Farm Bureau Hall	Feb. 16	Feb. 22	
Rockford (East)	Sweden House Motel	Feb. 17	Feb. 24	Mar. 17
Woodstock	Farm Bureau Bldg.	Feb. 17	Feb. 24	Mar. 3

That's where we'll be and when we'll be there. As you can see we're planning a busy winter. We all wish you a good year ahead - and invite you to join us in our Corn Count-Downs. See you soon!!

W. D. Pardee
Extension Agronomist

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Urbana, Illinois

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No. 323

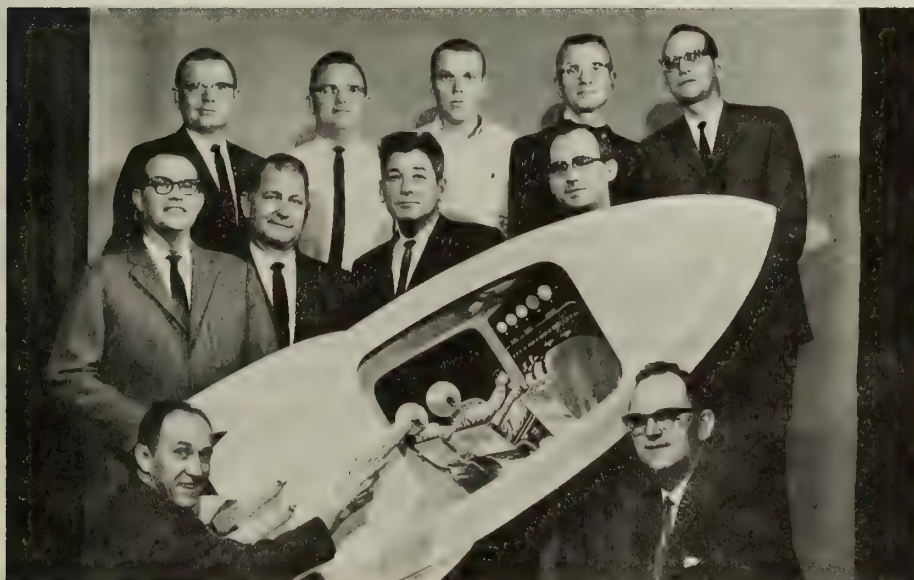
December 17, 1965

A HAPPY NEW YEAR

FROM ALL OF US

AND AN INVITATION TO JOIN US IN OUR 1966

"CORN COUNTDOWNS"



Here we are tooling up our 1966 Corn Countdown programs for blast-off. Top row, left to right, Marshal McGlamery, Weed Control; Fred Welch, Soil Fertility; Steve Moore, Department of Entomology; Roland Weibel, Crop Varieties; and Ted Peck, Soil Testing. Second row, left to right, W. O. Scott, Crop Production and Management; Marlowe Thorne, Head, Department of Agronomy; Tom Hinesly, Soil Tillage and Conservation; and Ellery Knake, Weed Control. In the foreground is Sam Aldrich, Soil Fertility, holding ears from a cornfield that yielded over 200 bushels per acre last summer. On the right is Bill Pardee, Crop Production and Management.

We'll be coming your way soon in meetings at over 40 locations in the state with the newest ideas in profit-making corn production. Joining forces for these programs will be U. of I. extension agronomists, entomologists, area agronomists, and county farm advisers.

Here's the countdown on some of the lead topics:

7. Insecticides. What's new in residues? How can we control aldrin-resistant rootworms? And what troubles will the southwestern corn borer, western rootworms, and other corn pests give us in '66?
6. Weed-killers. New chemicals--and new concepts of application--that will pay off for you. Also, new results on herbicide mixtures for better weed control.
5. Row widths and planting patterns. How much more will narrow rows yield--and where do they fit best? Should you hill-drop or drill corn?
4. Plant populations. How high is high? How far can you raise your corn populations and still boost yields? What risks do you run if you plant too many plants per acre? The answers will vary, depending on your soil and the way you farm--but we'll spell out the critical factors you should consider.
3. Tillage practices. Reduced tillage, minimum tillage, chemical tillage, zero tillage--we're hearing more and more about less and less tillage. We'll cover the facts as we see them, bringing you the newest research results.
2. Choosing a hybrid. Double-cross, single-cross, special cross, sisterline, and three-ways--they're all on the market. We'll cover each of them and tell what they can do. We'll also give some pointers on how you can find the best hybrids for your farm.
1. Fertilization. Nitrogen, phosphorus, and potassium--the big three. What factors do you consider in figuring a fertilizer plan for your corn crop? We'll report results with micronutrients--and with lime--including the way anhydrous ammonia can affect your lime needs.

That's our countdown. We hope you'll join us. Everyone's welcome.

We'll cover these topics in two meetings a week apart. In many cases agricultural engineers and economists will hold additional meetings to cover machinery problems and management aspects involved in modern corn production.

In the next issue of Agronomy News we'll list our meeting places and dates so that you can pick the one nearest you. Or you may check with your county extension farm adviser for first-hand details. Come see us--and join in the countdown to get your '66 corn crop ready for BLAST-OFF!!

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crops and soils

February 4, 1966

No. 324

CHOOSE A TOP ALFALFA VARIETY FOR 1966

A number of new alfalfa varieties are producing startling yields in U. of I. tests and for top Illinois farmers. Yields of seven tons of hay per acre are common, eight-ton harvests aren't unusual, and we've seen proof of yields of well over nine tons of dry hay per acre.

There are two major strains among these new varieties: the so-called Flemish or European types and the North American varieties. The Flemish varieties are the best yielders if you want only one or two harvest years. Varieties like DuPuits, Alfa, FD-100, and Flamande SC-118 are the test-toppers, averaging around nine tons per acre in each of the past two years at Urbana. Early maturing, these varieties bounce back rapidly after cutting, and they resist insects and leaf diseases. Because they flower a week earlier than Ranger and other North American strains, they demand earlier cutting.

For stands longer than two years, you'll want one of the new North American varieties. Because Vernal, Progress, Cayuga, 525, WL 202, and WL 303 flower a week later than the Flemish varieties, they are often easier to manage than Flemish varieties. They also resist leaf diseases better than older varieties and have given excellent yields in Illinois trials and fields.

If you are a dairyman or livestock farmer with a large acreage, you can spread out your first harvest by using several new varieties. For instance, you can plant one of the Flemish varieties for earlier harvest and then a North American variety to come along later. You may even choose one of the intermediate types to fill in between.

Also on the market are several varieties that rank between Flemish and North American in growth. Saranac and Haymore both do well in long-term stands, and yet they have much of the vigor of the Flemish varieties.

You may wonder what happened to Kansas alfalfa--or Oklahoma, Dakota, or Washington. These strains are obsolete, as they fall far below the newcomers in forage yield and in quality. Ranger, our best variety for many years, is also outdated. In Illinois tests Ranger has not been able to equal the new Flemish and North American varieties either in yield or in disease resistance.

If you're planting alfalfa for plow-down, good, clean seed of almost any source can fill your need. But if you plan to grow forage, you'll find that the new high-yielding varieties will pay off.

Good seed of a top variety often costs a bit more, but you get a bonus for your money. Figure your acre seed costs--and the value of your probable yield increase. It may cost a dollar or so more per acre to seed a new alfalfa variety instead of an old-timer, but you may get a ton or more of dry hay--or four to five more tons of green feed--from each acre as long as you leave the stand down. This adds up to an excellent return for a dollar investment.

When buying alfalfa seed, it doesn't pay to look for cheap seed. Look for quality and for top varieties. Certified seed is available this winter for most of the varieties mentioned above. Buy from a seedsman you know in your area, who carries these up-to-date varieties. Good seed pays--but all seed is not good. And your crop can be no better than the seed you plant.

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Extension Agronomist

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1. If you farm a large acreage of corn and soybeans. The more acres you can spread the equipment cost over, the more return you will get on your investment.

2. If you harvested yields above 120 bushels an acre in recent years. If you are at this yield level or higher, then narrow rows can give you a yield response.
3. If your planting rate exceeds 20,000 plants per acre and you are on a high fertility program; if you control weeds and plant and harvest early.
4. If your harvest equipment and machinery is worn out and you are thinking of trading in the near future. If you can answer yes to the first three points listed here and you are ready to trade equipment, then your question may be "Why not shift to narrow rows?" However, if you have new or only slightly used equipment for 38- or 40-inch rows, then your trade-in loss may be more than the yield you will gain from narrow rows.
5. If you enjoy being the first to start a new practice. Farmer experience with narrow rows is not great and there will surely be tricks to learn in the field. Last year, a few innovators in central Illinois started with narrow rows. Some were highly successful. Others, however, had poor results, particularly those who pushed their population too high.

If you consider narrow rows, be particularly careful in your choice of hybrid. While narrow rows may not affect the hybrid directly, the increase in population that should accompany narrow rows can hurt those hybrids that have trouble at high populations. Be sure to choose a hybrid that stands well and does not go barren at high population.

With narrow-row corn you will need good, early weed control, but earlier shading of the ground may eliminate the need for the last cultivation. Also, few weeds come on during the summer, an added bonus from narrow-row corn.

Many farmers are asking how narrow they should go. In University of Illinois tests, 20-inch rows have never outyielded 30-inch rows, though both are superior to 40-inch spacings. So either may boost yields, but cultivation, harvest, and general equipment problems may be greater in 20-inch rows. Present herbicides are not consistent enough to work every year, everywhere, or on every weed. Rows wide enough for cultivation will be good insurance until a kill-all herbicide arrives.

Wide rows were set up for horses. Narrow rows may fit better in today's space age. But narrow rows aren't for everyone. You may have equipment problems, or you may limit yourself on the hybrids you can grow. However, if you are a top corn grower and are getting yields above 120 bushels per acre, consider the narrow-row possibility carefully the next time you plan equipment purchases.

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crops and soils

April 5, 1966

No. 326

SPRING CONTROL OF QUACKGRASS

If you farm in northern Illinois, you're probably all too familiar with quackgrass. In fact, it may well be your most troublesome weed. Spreading both by seed and by underground stems, quackgrass steals moisture and nutrients from crop plants, and dollars from your pocket.

But crop losses from this pest are no longer necessary. Modern weedkillers can control quackgrass effectively and economically. Three chemicals--atrazine, amitrole-T, and Dowpon--have shown good results in U. of I. tests. Most consistent has been atrazine. One or more of these may fit into your program.

Atrazine enters the quackgrass plant through both leaves and roots and fouls up the food-manufacturing processes. As the plant uses up its food reserves it dies. Corn also absorbs atrazine, but corn produces a substance that deactivates the atrazine.

You can treat quack with atrazine in either fall or spring--whichever fits your operation best. Since spring's right around the corner, here are several methods for spring application that have shown up best in research plots.

You can get good control with a single application when the quackgrass begins active growth. Spray on 5 pounds of Atrazine 80W in 20 to 40 gallons of water per acre. Wait 3 weeks before plowing, so that the chemical will have time to circulate.

Split applications will also work. You can apply 2 1/2 pounds of Atrazine 80W per acre before plowing, then follow up with 2 1/2 pounds more as a broadcast preemergence at planting time. Many farmers like this method since it gives them the added advantage of better control of annual weeds germinating from seeds.

Five pounds of Atrazine 80W per acre (4 pounds active ingredient) is a relatively high amount. Fortunately, both corn and quackgrass help to decompose atrazine. But if you get too high a rate, or too much atrazine carries over in the soil, you can damage oats, soybeans, or vegetables the following year. It is best to plant the field to corn at least one more year. When you use atrazine for quackgrass control, plan on a year with no additional atrazine before switching to sensitive crops. This allows more complete breakdown of atrazine in the soil and helps avoid damage to sensitive crops in subsequent seasons.

You can reduce risk of carry-over in several ways. If your quackgrass is only in patches, you don't need to treat the whole field. Spot treatment is cheaper and reduces the carry-over problem in the field. But don't put on too much chemical in one spot or you'll have trouble later on with sensitive crops in that spot.

Atrazine with amitrole-T. Where you prefer to use lower amounts of atrazine, amitrole-T may be applied to actively growing quack in the spring. Use one gallon of amitrole-T or Cytrol in 20 to 30 gallons of water per acre. Plow 10 to 14 days later, after the quackgrass has turned white. Prepare the seedbed and plant corn as soon as possible. Then broadcast 3 3/4 pounds of Atrazine 80W per acre at planting time to give additional quack control and also to control annual weeds. On soils low in organic matter, 2 1/2 pounds of Atrazine 80W may be sufficient.

Although this combination of amitrole-T and atrazine has not usually controlled quackgrass as well as 5 pounds of Atrazine 80W alone, it has sometimes been quite effective. The combination allows use of less atrazine, and if the stand of quackgrass is dense enough to help decompose the atrazine, it may be possible to grow sensitive crops the year after the combination is applied.

Dowpon for other crops. You can't use atrazine this year where you plan to grow crops other than corn--soybeans, for example. But you can get some quackgrass control with pre-plow applications of Dowpon. You can also use it before planting corn, although it has not generally given as complete control as atrazine.

This spring, when quackgrass is about 6 inches tall and growing well, you can spray with 6 to 8 pounds of Dowpon in 30 to 40 gallons of water per acre. After spraying, wait 7 to 10 days before plowing and another 3 to 4 weeks before planting a crop.

There is little danger that Dowpon will carry over in the soil when applied in the early fall. But spring applications may damage the crop unless there are at least 4 to 5 weeks of warm, moist weather between application and planting.

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No. 327

REDUCED TILLAGE ON FALL-PLOWED CORN LAND

Don't overwork your fall-plowed ground. If you were able to do a good job of plowing last fall, you may need very little soil preparation before corn planting time.

Traditionally, spring tillage of fall-plowed land was thought necessary to control weeds and improve the seedbed by smoothing and firming it. Modern farm practices may have changed this situation.

Let's look first at the matter of early weed control. Most annual weeds do not begin to germinate until soil temperatures are around 50° F. at a depth of three or four inches. Average daily soil temperatures reach this point about the middle of April in central Illinois, somewhat earlier in the southern area, and later in the northern part of the state. So most of the early weed germination does not come until late April or early May. Therefore, additional surface tillage cannot be justified from the standpoint of destroying weeds. For late-planted corn you may need additional tillage, but for early-planted corn on fall-plowed ground, one surface tillage operation just before planting should be plenty.

How about smoothing and firming the seedbed? Pulverized and compacted seedbeds may be ideal for seed germination, but they are not always best for later plant growth. Compacted seedbeds may hasten speed of germination, but they can decrease yields.

Too many surface tillage operations destroy the desirable granulation produced by the plow. As the soil is compacted and pulverized, water infiltration is reduced, causing increased runoff and soil erosion on sloping land. On the other hand, coarse granules can withstand the impact of raindrops and hold an open structure necessary for rapid movement of water through the soil surface for fast drainage and good soil aeration.

Fall-plowed land settles into an adequate state of firmness by corn planting time. The most that is usually needed for corn planted by early May is one disking to destroy any weeds that may be growing. On the other hand, loose, spring-plowed land usually needs some firming of the seedbed. But it's best to restrict the firming to the row, leaving the middles rough and loose. That is the aim of all minimum tillage systems.

When planning to prepare your seedbed and control weeds, remember that a corn kernel is about four times as large as the average weed seed. Therefore, you can plant corn two to three inches deep in the soil where it has a good chance of picking up moisture for germination. Early season moisture is more dependable and temperatures are lower, so early-planted corn should be planted shallower than late-planted corn. Early corn planted too deeply in cold soil often is attacked by soil-borne seedling diseases and insect damage.

On the other hand, tiny weed seeds must germinate at the soil surface. If this surface is rough and loose, weeds will have difficulty reaching the water they need for germination.

If you find that it is necessary to disk far ahead of planting to control weeds, you can avoid an additional disking by using cultivators at planting time. Cultivators lift and loosen the soil surface, whereas the disk harrow produces compaction below the depth at which it moves the soil. Often this "disk pan" is a very thin, compacted layer, but it still can determine the rate at which water moves into and through a permeable soil. The fewer times you disk, the better your soil tilth will be throughout the growing season.

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April 15, 1966

No. 328

SEEDING SUGGESTIONS FOR RETIRED ACRES

Acres retired from production under various government programs should not become forgotten acres. It makes sense to seed them to either grasses or legumes to hold the soil against erosion, to control weeds, and to maintain land values.

The first of the two major land retirement programs is that in which a farmer takes a portion of his feed grain acres out of production for one year. Here he is interested in controlling weeds and holding his soil. He also has an opportunity to grow some nitrogen for next year's crop.

In this situation the best seeding choice depends on where the farm is located. In northern and central Illinois, alfalfa is probably the best bet. It will provide summer cover and a good plow-down crop for fall or spring.

If this farmer wants a grass to mix with the alfalfa, ryegrass will probably give more first-year growth than any other grass.

Since he's not concerned with forage yields or maintaining a long-lived stand, he can use almost any alfalfa seed--so long as it rates high in germination and purity and low in weed seed content. The same is true of the ryegrass.

The best way to seed alfalfa is probably with oats. Clip the oats at heading time to reduce competition with the seeding. On good soil and with plenty of rain, alfalfa may grow enough to require clipping again in late summer.

Don't overlook these diverted acres as an opportunity to seed first-rate stands of forage for future years. Here you'll want to use the top-flight new varieties now available.

Southern Illinois farmers may prefer alfalfa or sweet clover as a crop to grow on diverted acres. Either one will provide cover and some growth for plow-down next fall or spring.

The second land retirement program includes farms diverted from production under the Cropland Adjustment Act of 1965. In most cases they are whole farms being retired from cropping for five or 10 years.

Here again a participating farmer should be concerned with keeping a good cover on the land to hold the soil against erosion, keep down weeds, and maintain the value of his land.

Southern Illinois farmers will probably find a fescue-lespedeza mixture most useful for these long-term stands. Central and northern Illinois farmers may prefer an alfalfa-brome or alfalfa-timothy mixture.

If alfalfa will grow on the land, it should be included in the seeding mixture. Choose a long-lived variety--one that is resistant to bacterial wilt. Cody or Buffalo would be a good choice in southern Illinois. In central and northern Illinois, Ranger can serve to good advantage. It is a bit behind newer varieties in forage production, but it can provide good long-lasting ground cover. Do not choose common alfalfa strains, those with state names, such as Kansas, Nebraska, Dakota, etc. These are generally susceptible to bacterial wilt and will die out in two or three years--far short of the five or 10 years of life desired for these acres.

Where soil pH or fertility is too low for alfalfa, some farmers may prefer to sow only a grass to hold the soil in place. In this case fescue should probably be the first choice in southern Illinois, and brome grass in central and northern counties.

Chances are that most farmers will prefer not to invest heavily in fertilizer to establish these five- or 10-year stands. Still, they should put on enough lime, phosphorus, and potash to get the crop up and growing.

In most cases the seeding should be made during April. But since no yields are to be harvested, the planting date is not critical. If other work prevents seeding in April, there's still time to get the job done in May with nearly as much chance of getting a good stand. However, good seedbed preparation becomes particularly important in May seedings.

One additional advantage of good ground cover is that it makes for better hunting. In northern and central Illinois pheasants find alfalfa attractive cover, while in southern Illinois quail pay lots of attention to lespedeza.

A good seeding on retired land can pay off in controlling weeds, preventing soil erosion, and holding or improving land values. So don't let your retired acres become forgotten acres.

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No. 329

SPRING TREATMENT OF JOHNSONGRASS

If you have Johnsongrass on your farm, it's time to plan your spring control. Johnsongrass is one of the real field-hogs, often crowding out corn and soybeans and cutting yields in half or worse. It has become the most serious weed pest in the southern third of Illinois.

Because Johnsongrass spreads by both underground stems (rhizomes) and seeds, a control program must consist of an "old grass" program, a "new grass" program, and a long-range program. The old grass program consists of getting rid of old stands and breaking down root reserves of the spreading rhizomes. The seedling program involves controlling young plants that arise from seed, and it is probably just as important as killing the old grass. Seeds in the soil can germinate over a three- to five-year period. A successful long-term program must prevent seed production and also control seedlings. Such a program will hold the gains you've made against Johnsongrass by preventing seed production by any plants that get through your control "blitz."

A three-phase control program--killing all existing Johnsongrass stands, controlling new seedlings, and starting a long-range program to prevent reinfestation--is a must if you hope to control this profit-stealing pest.

Here's how to control Johnsongrass successfully. In corn or soybean fields where dalapon--Dowpon--was not used the previous summer or fall, follow these steps to kill old grass:

1. Hold off spring tillage to let the Johnsongrass grow 10 to 12 inches high.
2. Spray with dalapon. Use 5 to 10 pounds per acre in 30 to 40 gallons of water.
3. Plow 7 to 10 days after treatment.
4. Wait two or three weeks after plowing to plant.

In your "new grass" program, use preemergence herbicides to control seedlings, and do a good job of cultivating. Use the following herbicides:

- Corn--Eptam at the rate of 3 pounds active ingredient per acre. Broadcast and incorporate slightly. For 14-inch bands, use one pound of active ingredient per acre.

2. Soybeans--Treflan at the rate of 1 pound per acre; incorporate thoroughly.
Amiben at the rate of 3 pounds per acre; do not incorporate. Vernam at the
rate of 3 pounds per acre; incorporate slightly.

Then, to hold your gains, destroy small clumps of Johnsongrass before they seed.

Since the spring treatment delays planting a month, you'll want to select suitable hybrids or varieties for late planting. The yield increase from controlling Johnsongrass will more than offset the loss in yield from delayed planting.

Spring treatments of dalapon have not been so satisfactory as summer or fall applications, but "better late than never." The yields with spring treatment are much higher than those without treatment.

If you are not willing to delay planting to control the old grass, it will still pay to control seedlings with one of the suggested preemergence herbicides. Some farmers say that if they had to give up either the old grass program or the seedling program, they would keep the seedling program.

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June 2, 1966

No. 330

SIDE-DRESSING CORN WITH NITROGEN

Illinois farmers are rapidly increasing the amount of nitrogen they apply, and side-dressing is a popular way to apply it. Side-dressing is not necessarily better than plowing-under or broadcasting in the fall or before planting. Each way has its advantages. Personal preference, available equipment, convenience, and cost may be the determining factors.

Side-dressing is your last chance to apply nitrogen if you did not apply enough earlier or if you had unusually heavy rains after planting. Leaching of nitrogen often occurs on sandy soils. Extra-wet conditions, after the soil has warmed up in mid-May, can cause loss of nitrogen through denitrification on poorly drained soils.

Side-dressing has some special advantages: (1) You can apply nitrogen in years when you most need it and omit it in other years. If, for example, you have an unusually good stand and plenty of moisture in the subsoil to produce top yields, you can side-dress at an extra-heavy rate. But, if you have a very poor stand of corn or large areas have been drowned out, you can save the nitrogen you planned to side-dress. (2) Side-dressing gets the nitrogen on after you've controlled the weeds, so you fertilize corn, not weeds. (3) There's less time for nitrogen to leach from sandy soils or to break down--by denitrification--in poorly drained soils.

You can side-dress dry, liquid, or gaseous nitrogen carriers. Cost, available equipment, and convenience should dictate which form to use. If applied correctly, the different forms of nitrogen are nearly equally effective. If you compare costs, look at the cost per pound of actual nitrogen applied to the soil.

How about side-dressing phosphorus and potassium with the nitrogen? This isn't the first choice, though it may be used in an emergency where the soil tests low in phosphorus and potassium and you were unable to get them on earlier. Corn needs phosphorus and potassium early, in its first few weeks. And these elements stay where you place them in the soil, so they'll be too near the surface for most efficient use in midsummer.

Nitrogen placement, how deep and where? Nitrogen side-dressed on the soil surface won't be effective until rain moves it down where roots are actively feeding. Corn roots can't operate in dry surface soil, so side-dress dry and non-pressure liquid forms preferably one to two inches deep. Some nitrogen carriers must be discharged under the soil surface to prevent volatilization losses, so place anhydrous ammonia six inches or deeper, depending upon your rate. Put solutions that contain small amounts of free ammonia at least one inch deep and aqua ammonia three or more inches deep, depending on the amount you apply.

When should you side-dress? You can side-dress nitrogen any time from corn planting time until the plants are too tall to get equipment through. Late application minimizes the chance of loss from denitrification or leaching, but it increases root damage. Besides, a prolonged rainy period would prevent timely application. Side-dressing before the plants are "knee-high" is suggested.

How much nitrogen should you apply? The amount depends upon how much total nitrogen you estimated it would pay you to use, how much you applied before or at planting time, and how much may have been lost by leaching or denitrification. Here are suggested total amounts of nitrogen to apply. To determine the amount to side-dress, subtract the amount that you have already applied.

Situation 1. Following a good legume sod or 10 tons of manure. Dark prairie soils with a good legume sod or 10 tons of manure can usually supply enough nitrogen for 90 to 100 bushels of corn. If you aim for 150 bushels, you'll need 70 to 100 pounds of nitrogen per acre besides the legume or manure. On light-colored timber soils, apply about 25 more pounds per acre than on dark soils for the same conditions.

Situation 2. Following soybeans, a small grain--no catch crop--or one year of corn where you grow legume hay or catch crop once in five or six years. Use 100 to 140 pounds of nitrogen on dark prairie soils and 120 to 150 pounds on light-colored timber soils. Apply the lower rates on soils that produce 70 to 80 bushels of corn per acre in average years with good management. Apply the higher rates on soils that average 100 to 110 bushels per acre. These soils will produce 140 to 175 bushels in the best years with economical fertilizer rates.

Situation 3. Continuous corn or corn-soybean grain farming system. For best results, corn requires 125 to 150 pounds of nitrogen per acre in such a system (even up to 175 or 200 pounds for early planting and 24,000 plants per acre). The lower rate is for very dark, imperfectly drained soils, and the upper rate is for deep, well drained prairie soils.

Situation 4. Field flooded for several days. Wherever water stands for three or more days in late May or June, great loss of nitrogen occurs by denitrification. If the stand of corn is still good, your best bet is to side-dress as soon as possible at one-half to three-fourths of the original rate.

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June 3, 1966

No. 331

1966 AGRONOMY FIELD DAYS

This summer's Agronomy Field Day program is set--and we hope it's as exciting to you as it is to us. Here's a rundown on dates coming up in June--and a calendar for those later in the summer....

Brownstown Research Center (Fayette County), Thursday, June 16, 9:00 a.m.

Pat Johnson's first-rate program has a "new look" this spring, with many changes in rotation and fertility studies. Featured will be fertility treatments that brought 77 bushels of wheat per acre last year, as well as high-yielding new varieties. You'll see new research with soil pH, fertilizer rates, and weed control. Entomologists will bring you up to date on corn pests and the alfalfa weevil, while plant pathologists will cover new developments in crop diseases. Tours will leave continuously through the morning. Lunch will be served.

Newton Research Field (Jasper County), Tuesday, June 14, 1:00 p.m.

Pat Johnson, other agronomists, and farm advisers will team up to discuss soil fertility, "slick spots," wheat varieties, weed control, and management practices for corn, soybeans, and forages. You'll see techniques for removing sodium from slick-spot areas. Wheat growers can check the best times and rates for applying nitrogen. Corn and soybean growers can check Pat's plots that have grown continuous corn and soybeans for 15 years.

Carthage Research Field (Hancock County), Tuesday, June 21, 6:30 p.m.

John Dillon, new area agronomist, and assistant farm adviser Tom Haining plan a "big show" this year. You'll see new research measuring the effect of high potassium rates on lodging and yield of corn. You'll also see corn planted on April 1 (it may be tasseled by June 21). Banded and "pop-up" fertilizer for corn will be discussed--as well as oat and wheat varieties, narrow-row corn and soybeans, and other top management practices. Some of these practices brought in over 200 bushels of corn per acre on this field last year.

Hartsburg Research Field (Logan County), Wednesday, June 29, 1:00 p.m.

Larry Miller, everybody's favorite agronomist, and farm adviser Harold Brinkmeier will discuss new practices in crop production. Larry will describe new fertility and rotation experiments started this spring. Other features include continuous corn and continuous soybeans with various fertility treatments. You'll also see new wheat, oat, and soybean varieties.

Northern Illinois Research Center (DeKalb County), Thursday, June 30, 1:15 p.m.

Derreld Mulvaney, area agronomist, and farm adviser E. E. Golden are set to discuss new research under way. Area farm advisers, agronomists, entomologists, and pathologists will join to bring you the newest on all phases of crop production. You'll see research comparing nitrogen rates on early-planted corn, as well as the effect of early planting on late, medium, and early maturing varieties. And you'll also see comparisons between fertilizer applied near the seed and in contact with the seed--the so-called "pop-up" treatment.

You'll see Amsoy, a new soybean variety with an outstanding yield record--six years with above 48 bushels per acre. New oat varieties will also be on view, several of which went over 130 bushels per acre last year. And you'll view new alfalfa varieties, also with outstanding yield records.

Last year over 800 visitors attended this "Open House." Chances are there will be even more this year. We hope you'll come too.

Field Day Calendar for July, September

<u>Date</u>	<u>Field</u>	<u>County</u>	<u>Starting time</u>
July 27	Dixon Springs	Pope	1:00 p.m.
July 28	Carbondale	Jackson	1:00 p.m.
September 1	Kewanee	Henry	1:00 p.m.
September 1	Carlinville	Macoupin	6:00 p.m.
September 1	Newton	Jasper	1:00 p.m.
September 6	Brownstown	Fayette	9:00 a.m.
September 7	Aledo	Mercer	1:00 p.m.
September 7	Ewing	Franklin	1:00 p.m.
September 8	Dixon	Lee	1:00 p.m.
September 8	Toledo	Cumberland	1:00 p.m.
September 9	Carthage	Hancock	1:00 p.m.
September 13	Clayton	Adams	1:00 p.m.
September 15	Urbana (Agronomy Day)	Champaign	7:00 a.m.
September 20	Elwood	Will	1:00 p.m.

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September 15, 1966

ATTEND AGRONOMY DAY - SEPTEMBER 15

No. 332

The welcome mat is out for you to attend Agronomy Day September 15 at Urbana. We have a big day planned, and we expect a record-breaking crowd at the Agronomy South Farm. Three-hour tours will leave all day, starting at 7 a.m. There will be lunch and refreshments on the grounds. If it rains, we will hold the program in the Stock Pavilion. The program highlights are:

1. Keeping Illinois Number 1 in Agriculture: Who doesn't enjoy being number 1? Dean Bentley, our number 1 man in the College of Agriculture, and Associate Deans Claar and Russell will give us their plans for keeping Illinois Number 1. This is a high-powered stop; don't miss it.
2. Unlocking Soybean Secrets: Johnny Pendleton wants you to increase those soybean yields the same way you are increasing corn yields. After you see his stop, I think you'll agree with his title. What do leaf size and shape have to do with light interception? How much light gets through the soybean canopy? What does all this do to yield? Hear what Johnny has to say.
3. High-Lysine Corn: This may well be the biggest advance in corn breeding since hybrid corn. Corn breeders Alexander, Lambert, and Dudley will discuss their work. Come and find out how this discovery may affect the way corn is used in Illinois and the world.
4. Corn Planting Dates and Nitrogen Response: This work is shaping a lot of decisions you are making. Is 1966 going to reinforce prior data, or will drought stress offset some of the gain from early planting? Agronomists Mulvaney and Boone will show you the plots and explain their work.
5. Planting Patterns: Agronomists Egli and Dillon will bring you up to date on row spacing in corn and soybeans. Some exciting experiments are their equal-distance corn at 15 and 20 inches and their soybean systems including TIBA, row width, varieties, and fertilization. Corn plants every 15 inches are a lot of plants--come and see how they have performed.
6. Weed Control in Corn: Weed specialists Knake and McGlamery will bring you up to date on the ever-changing corn herbicide front. What about herbicide mixtures? What about incorporation? See the exciting results September 15.
7. Fertilizing Soybeans for Top Profit: Are leftovers all of the fertility soybeans need, or will additional fertility pay? Fertilizing soybeans is a deep subject, but you will have fewer questions after hearing Sam Aldrich on Agronomy Day.
8. Soybean Light Studies: Agronomists Johnson and Hicks have done some work in use of artificial light in soybeans. Can you increase pod set, reduce leaf drop, and increase yield? You'll find their results exciting.
9. Drought, Heat, and Corn: Everyone is talking about the unusual weather we had in June and July. What effect will it have in your cornfield? Hear a report of this research from Scott and Graffis.

10. Soybean Varieties: What's the latest new variety for you? How about Wayne? What else shows promise? Let soybean breeders Bernard and Hadley fill you in on September 15.
11. Stalk Rot, Leaf Blight, and Corn Diseases: Is high potassium all you need to prevent stalk rot? Pathologists Hooker, Wilkinson, and Hughes will show some of their new research on stalk rot, leaf blight, and other corn diseases.
12. Weed Control in Soybeans: Fred Slife and Lloyd Wax will give you the latest information on soybean herbicides. Can you drill soybeans and use a herbicide for weed control? Find out on Agronomy Day.
13. Nutrient Mobility and Corn Fertilization: Fertility specialists Welch and Hughes will give results from their new fertility experiments on corn. Get some profit-making pointers that you can put to good use on your farm.
14. Ten-Ton Alfalfa: Where to From Here?: Forage specialists Hittle and Jackobs continue to change many ideas about forage. Let them tell you how they did it and which varieties they used. This stop is a must if you grow alfalfa.
15. Soils, Subsoil Fertility, and Crop Response: Soil specialist Oschwald has dubbed his stop "The Tale of Three Soils." Find out how subsoil fertility and rooting depth of three major Illinois soils affect their response to surface-applied fertility. You'll find this work exciting--don't miss it.
16. Winter Wheat Varieties: With our dwindling wheat surplus, a partial relaxation of controls, and talk of further relaxation, we may see acreage soar in parts of Illinois in the near future. Let Charlie Brown tell you what wheat varieties did what in 1966 tests.
17. Plant Analysis and Corn Yields: What can we find out from plant analysis that we can't find out any other way? Where does it tell us to go from here? Let Ted Peck and Bill Walker fill you in on Agronomy Day.
18. Soybean Diseases: Plant pathologists Chamberlain and Shurtleff will discuss soybean diseases prevalent in Illinois this year. What disease is where, and how severe is it? Here you'll get the latest information.

Another exciting stop for many will be the Igloo Corn Storage on the Agricultural Engineering Farm. Gene Shove will be there to give you all the highlights.

There's the Preview. Come to Agronomy Day and bring your neighbors. If you fly, we'll meet you and other Flying Farmers at the U. of I. airport. We're looking forward to our visit with you.

E. C. A. Runge
Agronomy Day Chairman

Cooperative Extension Service
United States Department of Agriculture
University of Illinois
Urbana, Illinois

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AGRONOMY NEWS

crops and soils

October 17, 1966

QUACKGRASS CONTROL TIPS

No. 333

Quackgrass is the most serious perennial grass weed in northern Illinois. A cool-season grass, it spreads both from seed and from underground stems (rhizomes). The straw-colored rhizomes creep along under the soil, sending up new shoots as they go.

But you no longer need to let "quack" bite into your yields. Results on test plots and in farmers' fields show that modern methods can control this pest. The key is atrazine. Fortunately, quack is very sensitive to atrazine. Corn, on the other hand, shows excellent tolerance to this herbicide.

You can use atrazine in several ways. Some methods give slightly better control than others, but the main point is to decide which treatment best fits your cropping sequence and time schedule.

When should you treat? The best time is fall or spring, when quack is making its most active growth. You can apply atrazine to quack in your corn or soybean stubble. Or you can put it on land that is being taken out of pasture, hay, or other uses and is going into corn in the spring. For fall treatment, try to apply the herbicide early enough to allow two to four weeks of active plant growth before the ground freezes.

How much chemical? Four pounds of actual atrazine (5 pounds of the 80% wettable powder) per acre has given good control. Be sure your sprayer is working properly, agitating the wettable powder well in the tank, and applying it uniformly on the field. Be sure not to exceed this rate. Don't overdose by lapping or covering the same area more than once. Shut off the sprayer in plenty of time when stopping or turning.

If the quackgrass is mostly in patches rather than in a uniform stand, spray only the patches. Four pounds of atrazine per acre is a relatively high amount. If you apply higher amounts or treat areas where there is no quack, the atrazine may damage small grains, soybeans, or vegetables on the field in later years. And don't use atrazine on lawns.

How about residues? Quack and corn help to decompose the atrazine. But, to be on the safe side, plant corn for two successive years after the atrazine application, and don't apply atrazine to the last year of corn before planting some other crop. Following these precautions will help you avoid a carry-over problem.

Fall treatment has given good results, and it allows more time for atrazine to decompose. However, if you prefer, you can apply the four-pound rate (5 pounds 80W) in the spring after quack has resumed active growth. Take the same precautions as with the fall treatment. Or you can split this spring application, applying two pounds of active atrazine (2 1/2 pounds 80W) per acre to the quack before plowing and another two pounds as a pre-emergence spray at planting time. This split application usually controls annuals better than the one-shot fall or spring treatment, and quack control has been almost as good.

Other chemicals can team up with atrazine to kill quackgrass. For instance, if you'd prefer to use lower rates of atrazine, you can apply one gallon of amitrole-T per acre in the spring to actively growing quack. Then plow 10 to 14 days later, plant corn, and apply atrazine as a pre-emergence at planting time.

Dalapon can also kill quack. There is little danger that dalapon will carry over in the soil when applied in the fall. But spring applications may damage corn unless you have four or five weeks of sufficiently warm, moist weather between application and planting.

Research now shows that you can control quackgrass. In fact, these treatments are among the most practical and effective of any modern weed control methods. Pick the one that fits your operation. You need not put up with quack any longer.

For further information on quackgrass control, obtain a copy of Illinois Circular 892, "Controlling Quackgrass in Illinois," from your county extension adviser or write to the Information Office, College of Agriculture, University of Illinois, Urbana, Illinois.

Ellery Knake and Marshal McGlamery
Extension Agronomists

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United States Department of Agriculture
University of Illinois
Urbana, Illinois

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AGRONOMY NEWS

crops and soils

November 1, 1966

MANAGING LATE FALL AND WINTER PASTURES

No. 334

Many acres of Illinois pasture and hay land can be used for late fall and winter grazing, but these fields should not be grazed indiscriminately. Careful attention should be given to both the time and extent of grazing permanent bluegrass or tall fescue pastures and also legume-grass pastures and hay fields.

During wet seasons pasturing should be confined to well-drained sites on tall fescue or bluegrass sods. Yields from pastures and hay fields are sharply reduced after severe trampling and deep cutting of the soil.

Pasturing grasses and legumes closely, particularly during winter, causes loss in vigor. Plants weakened by excessive grazing are more susceptible to injury from cold during the winter and heaving damage in the spring. Heaving damage is particularly critical in legumes.

The final stubble height for bluegrass pastures should be no less than 1 1/2 inches. Other tall-growing pasture and hay grasses should have at least 2 or 3 inches of stubble remaining when pasturing is discontinued. Grasses store their food reserves in the crown and base of stems and leaves. These reserves are needed to keep the plant alive through the winter and to initiate new spring growth. Although the rate of use of this food is quite low during the winter, it is still needed to keep the plant alive. Complete removal of leaves and stems during fall and winter grazing robs the grass plants of the energy they need to produce spring growth.

Pastures that are grazed to the bare ground do not hold so much snow as those having a little stubble. Snow is an insulator that modifies the changes in temperature at the plant level and protects it against short periods of extremely low temperatures. Grass and legume plants that are covered with an inch or more of snow are less likely to suffer cold damage than those without snow cover.

Winter pastures, usually tall fescue but also bluegrass, in which the summer production has been baled into round bales and left in the field should be divided into small grazing units. Animals should be restricted to the small units until the bales are well utilized. A general rule is to provide a week's grazing for the herd at a time. Determine the grazing units by the general rule of allowing one bale of hay per cow per day. For example, the grazing unit for an 80-cow herd would be about 560 bales (80 cows x 7 days). Animals on winter pasture also need a mineral supplement, according to specialists in the University of Illinois Department of Animal Science. Pasturing can be continued through most or all of the winter throughout southern Illinois if feed is available.

Don W. Graffis
Extension Agronomist

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AGRONOMY NEWS

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No. 335

November 1, 1966

HARVESTING ALFALFA IN LATE FALL

What happens to the alfalfa stand when cut late in the fall? When can a late fall harvest be taken?

The rains during September and October throughout most of Illinois have enabled alfalfa to make a "good" growth. A ton or more of hay is ready for harvesting in many alfalfa fields. This leafy high-protein growth is worth harvesting in most situations. It may be difficult to make into hay, but it can be wilted adequately to enable the making of high-quality legume silage.

Harvesting alfalfa in late October or early November causes little injury to the stand and production the following year. This is true when there has been no harvest between the first week of September and late October and when the crop is 1 1/2 years of age or more and is on a well-drained soil. Cutting as late as October 25 to November 1 does not allow alfalfa time to make much regrowth before cold weather. This will maintain a high food energy reserve in the alfalfa roots. Make the last summer harvest by September 1 in northern Illinois and by September 7 in central and southern Illinois, and make the late fall harvest after October 25.

One hazard from harvesting alfalfa in late October is the increased heaving that may occur the following spring. Without the crop residue to insulate the soil surface, fluctuations in soil temperature from freezing to thawing occur many times. With each refreezing condition, there is an upward push on the taproots of the alfalfa plant. With repeated thawing and refreezing of the soil surface, the alfalfa plant is gradually hoisted out of the soil. A mixture of grass with the alfalfa helps to reduce the heaving. An application of one or two tons of straw or strawy manure per acre during the winter helps to reduce the heaving problem by substituting for the crop residue that is removed. Well-drained soils have less free water in the soil surface to freeze than do poorly drained soils. The ice lenses formed in well-drained soils are fewer and smaller than those in poorly drained soils, and there is less heaving action on plant roots, particularly on the tapered taproots of plants like alfalfa.

Removal of a normal fall growth from alfalfa is not necessary for the health and vigor of the plant. An extra-heavy growth that could mat down during the winter should either be harvested or grazed after October 25. Occasionally field mice are more numerous in fields that have not had the fall growth removed. A high field mouse population can injure plants, but usually this injury is confined to small areas. For most situations, there is no reason to take a late October harvest from alfalfa except as a need for livestock feed.

Don W. Graffis
Extension Agronomy

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Urbana, Illinois

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JOHN B CLAAR, DIRECTOR
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AGRONOMY NEWS

crops and soils

November 3, 1966

No. 336

STORE HERBICIDES SAFELY

With the close of the harvest season and the approach of winter, it's time to check your herbicides to see that they are properly stored. Be sure to store them in a safe place so that children, pets, farm animals, and irresponsible people can't get to them. Then lock the storage place. If you don't have a separate storage room, you might consider building a low-cost wire cage.

Don't store herbicides close to food, feed, fertilizer, or other chemicals, such as insecticides. Some herbicides are volatile, and contamination might occur. Also check for open or broken bags and containers, and either seal or replace them. Tighten caps on bottles and cans. Check for leaks and destroy any leaky containers.

Store herbicides only in the original containers. If the label is gone, dispose of the herbicide. If the label is not completely legible but you can tell what the herbicide is, ask your dealer for a new label. **DON'T STORE ANY PESTICIDE IN SOFT DRINK BOTTLES, HONEY JARS, OR OTHER CONTAINERS THAT CHILDREN MIGHT RECOGNIZE AS FOOD OR DRINK CONTAINERS.**

Store liquid herbicides, such as some of the 2,4-D concentrates and Treflan, at temperatures above freezing. If the basement is the only warm area, use some judgment about what materials to store there and how to store them. Although some herbicides are relatively nontoxic and are not very volatile, others might cause a real problem if a container should leak or break. Just a little 2,4-D escaping from a container in the basement might find its way to the living area of the house and damage your wife's house plants. And a broken jug of Radox in the basement could be mighty unpleasant company.

Freezing not only may break some containers, but can also cause some herbicides to crystallize or "salt out." Sometimes the frozen materials will go back into solution after adequate warming and agitation, but it's best not to let them freeze in the first place. The use of held-over herbicides that have been frozen and later thawed may in some cases explain the lack of weed control. Most dealers know the effects of freezing and thawing, and they provide adequate storage facilities to prevent freezing. They also know what storage precautions to take with each specific material.

Store wettable powders and granular herbicides in a cool, dry place. The area doesn't need to be heated. But be sure that the containers are sealed and that the material doesn't get damp or wet accidentally. Also, don't store herbicides on oil floors.

When ordering your herbicides for next year, try to figure your needs closely enough to avoid having a lot to carry over and store.

Now is also a good time to make a safety check of your spray equipment and order needed new parts.

Don't forget to drain and clean your spray equipment. Check the screens and clean or replace them as needed. Be sure to drain water from the pump and any other parts that could be damaged when water freezes. Lubricate when necessary. Check hoses and clamps. Replacing old ones can help you get the herbicide where it belongs instead of on yourself. Replace brass nozzle tips after each one has been used for spraying 100 acres. If you have four nozzle tips for band-spraying behind a planter, put on a new set of tips after you have planted about 400 acres. Studies show that not only does the hole in the nozzle tip increase in size with use and wear, but the uniformity of the spray pattern can change, causing uneven application. Uneven spraying might affect weed control and could also increase the chances that certain herbicides might damage the crop. Nozzle tips cost so little that you will probably not have anyone giving you a high-pressure sales pitch to buy them. But you'll be doing yourself a favor to replace them.

Finally, check your supply of goggles, rubber gloves, and other protective clothing for handling herbicides. Order early so that you'll be ready to go in the spring.

E. L. Knake
M. D. McGlamery
Extension Agronomists

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Urbana, Illinois

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AGRONOMY NEWS

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November 22, 1966

WINTER BRUSH CONTROL

No. 337

If you have brush to kill on your farm, winter is a good time to do the job. You can clean out pasture and fence rows at a time when field work is slack. And with chemicals you can do the job without spending a long time in the cold.

Another big advantage of winter treatment is that there is less danger of chemical drift onto susceptible plants. But it's still a good idea to be particularly careful, even in winter, when spraying near orchards, shrubs, and ornamental trees. It is always best to spray when there is little or no wind. Be sure that your spray and drift hit only the brush you want to kill. Here are some tips from U. of I. weed specialists that may help you.

Treatment With 2,4,5-T

For best results, choose the ester form of 2,4,5-T for winter treatment. It kills more species and is more effective on many species than either 2,4-D or 2,4-D and 2,4,5-T mixtures. Some woody plants are not easily killed even with 2,4,5-T the first time. You may have to follow up with another treatment the next year.

Basal Sprays for Small Trees and Brush

Use a basal bark treatment, spraying or painting the lower part of the tree trunk with a gallon of 2,4,5-T containing 4 pounds of active ingredient mixed with 25 gallons of kerosene, diesel oil, or fuel oil. This amount is the same as one pint in three gallons of oil.

The spray is most effective when the bark is dry. Be sure to completely circle the trunk and cover it thoroughly to a height of 15 inches above the ground. Apply the spray until it runs down the bark and begins to wet the soil. And here's a tip: mixing an oil-soluble dye or a little paint with the spray will help you mark the treated areas. Mix a little of the dye or paint with a little spray solution in a glass jar or tin can to see if they mix well enough before putting in your sprayer. One gallon of spray material should treat about 33 trees three inches in diameter or about 50 trees two inches in diameter.

Foliar and Basal Sprays for Dense Stands

For dense stands, you may be better off to use both foliage sprays during the growing season and winter sprays. You may find it hard to apply basal sprays to such stands because you'll have so many stems to treat. And foliage sprays are only partly effective in dense stands. So use a foliage spray to thin the stand, and then kill the remaining plants the next winter with a basal spray.

Cuts and Frills on Larger Trees

Use the cut-surface treatment for trees over four inches in diameter. They often have bark too thick for basal sprays to penetrate well. Apply the herbicide through cuts or frills in the bark. You can make a frill by ringing the trunk of the tree with overlapping axe cuts that penetrate the sapwood at least one-fourth inch. Fill these frills with the basal spray solution given on page 1.

Stump Treatment

Stump treatment helps to prevent regrowth. Apply 2,4,5-T soon after cutting. Again, use the mixture recommended for the basal bark treatment. Spray or paint the tops and sides of the stumps until the solution begins to run off.

Granules and Pellets for Brush Control

Dybar and Urab brush-killers are available as granules or pellets for soil treatment. You can apply them any time that the ground is not frozen. Late winter or early spring applications usually give best results. Apply these dry materials in a circle halfway between the trunk and the outmost reaches of the branches. Rain dissolves the herbicide and carries it down into the root zone. Do not apply this material near desirable trees, since their roots may grow into the treated area. To kill solid stands, you may want to use broadcast applications instead of making spot treatments.

For additional information, request a copy of Farmers' Bulletin No. 2158, "Chemical Control of Brush and Trees," from your county extension adviser; Agronomy Department, University of Illinois, Urbana, Illinois; or U. S. Department of Agriculture, Washington 25, D. C.

Whenever you use a herbicide, be sure to read the instructions on the label and follow them carefully.

E. L. Knake
Extension Agronomist

M. D. McGlamery
Extension Agronomist

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AGRONOMY NEWS

crops and soils

December 23, 1966

No. 338

SEASON'S GREETINGS AND A PROSPEROUS NEW YEAR
FROM YOUR AGRONOMY EXTENSION STAFF



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Front Row, L to R: Bill Walker, Don Graffis, Marshal McGlamery,
W. O. Scott, Sam Aldrich. Back Row, L to R: Ted Peck, Tom Hinesly,
Bill Oschwald, Ellery Knake, Dale Millis, Fred Welch.

We have enjoyed working with you in the past year and look forward to working with more of you next year. To help you know us and decide how we can best serve you, we are listing our specialty areas. We hope you will write or call us if we can be of help to you.

Bill Walker - Soil Fertility - Soil Testing
Don Graffis - Forage Crop Production
Marshal McGlamery - Weed Control
W. O. Scott - Seed and Crop Production

Sam Aldrich - Soil Fertility
Ted Peck - Soil Chemistry - Soil Testing
Tom Hinesly - Soil Physics - Soil Management, Tillage
Bill Oschwald - Soil Classification - Land Use
Ellery Knake - Weed Control
Dale Millis - Crop Production
Fred Welch - Soil Fertility

Members of our staff not appearing in the picture:

M. D. Thorne - Head of Department of Agronomy
Les Boone - Soil Fertility (Experimental Fields, Mt. Vernon)
John Dillon - Soil Fertility (Experimental Fields, Macomb)
Pat Johnson - Soil Fertility (Experimental Fields, Newton)
George McKibben - Crop Production (Dixon Springs Station)
Darrel Mulvaney - Soil Fertility (Experimental Fields, Marseilles)
Gene Oldham - Soil Fertility (Agronomy South Farm, Urbana)

During January and February we will be coming your way with several programs. Three special programs are Corn and Soybean Blast-Off, Corn Count-Down, and Soybean Day. In each of these meetings, we will be discussing fertility, varieties, weed control, and soil and crop management practices. Entomologists will participate in some of these meetings to discuss insect problems and control. Corn and Soybean Blast-Offs and Corn Count-Downs will be two-day meetings. The Soybean Day will be a one-day meeting. Watch for the next Agronomy News for the schedule dates and places for these meetings.

Don W. Graffis
Extension Agronomist

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NA, ILLINOIS

AGRONOMY NEWS

crops and soils

December 19, 1966

WINTER MEETINGS

10 - 9 - 8 - 7 - 6 - 5 - 4 - 3 - 2 - 1 -

IGNITION - CORN-SOYBEAN BLAST-OFF

No. 339

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The count-down is completed, ignition A-OK, and we are ready for the CORN-SOYBEAN BLAST-OFF. Here is plenty of "power-packed" information to help you get your corn and soybean production "off-the-pad" and into "orbit."

Your farm adviser, the Agronomy Department, and the Department of Agricultural Entomology are cooperating to bring you the latest information on fertilization, land use, varieties, soil and crop management, insect control, and weed control for these crops. Mark your calendar now for the most convenient date and location for you. Contact your farm adviser for further information.

CORN AND SOYBEAN BLAST-OFF

<u>County</u>	<u>Location</u>	<u>First Day</u>	<u>Second Day</u>
Livingston	Presbyterian Church, Pontiac	Jan. 3	Jan. 17
Woodford	Elms, El Paso	Jan. 3	Jan. 17
Will-Cook-N.Kankakee	Francis 4-H Field, New Lenox	Jan. 4	Jan. 11
Sangamon	Heritage House Restaurant, Springfield, Rt. 66	Jan. 4	Jan. 10
Christian		Jan. 4	Jan. 10
McHenry-Kane	Huntley Church, Huntley	Jan. 5	Jan. 12
DeKalb	Farm Bureau Building, DeKalb	Jan. 5	Jan. 12
Logan	V.F.W. Building, Lincoln	Jan. 6	Jan. 13
Iroquois	Farm Bureau, Watseka	Jan. 6	Jan. 18
Tazewell	Pekin Memorial Arena, Pekin	Jan. 11	Jan. 18
Peoria	Farm Bureau, Peoria	Jan. 11	Jan. 18
McLean	Illinois Wesleyan Memorial Center, Bloomington	Jan. 17	Feb. 3
Coles-Cumberland	Burgess-Osborne Auditorium, Mattoon	Jan. 18	Feb. 1
LaSalle	Farm Bureau, Ottawa	Jan. 19	Feb. 3
Madison	Farm Bureau Building, Edwardsville	Jan. 19	Feb. 2
Stephenson-JoDaviess	Extension Office, Freeport	Jan. 19	Feb. 2
Carroll-JoDaviess	Farm Bureau Building, Mt. Carroll	Jan. 19	Feb. 2
Winnebago-Boone	Sweden House Motel, Rt. 20 & Alpine Road	Jan. 20	Feb. 3
St. Clair		Jan. 20	Jan. 24
Monroe	Farm Bureau Building, Waterloo	Jan. 20	Jan. 24
Champaign-Ford	Illini Union, University of Illinois	Jan. 23	Jan. 24
White	Farm Bureau Building, Carmi	Jan. 24	Jan. 31
Wabash	V.F.W. Hall, Mt. Carmel	Jan. 24	Jan. 31
Shelby	4-H Center, Shelbyville	Jan. 31	Feb. 8
Moultrie	Masonic Hall, Sullivan	Jan. 31	Feb. 8
Hancock	Extension Center, Carthage	Feb. 1	Feb. 9
Adams	Farm Bureau, Quincy	Feb. 1 (One day only)	
Ogle-Lee-Whiteside	Loveland Community Hall, Dixon	Feb. 1	Feb. 7

<u>County</u>	<u>Location</u>	<u>First Day</u>	<u>Second Day</u>
Saline-Gallatin	Feb. 1 - Farm Bureau, Ridgeway	Feb. 1	Feb. 9
Henry	Feb. 9 - Bank of Harrisburg, Harrisburg		
Macon	Farm Bureau Building, Cambridge	Feb. 2	Feb. 7
Montgomery	Contact your farm adviser	Feb. 2	Feb. 10
Pike	Farm Bureau Building, Pittsfield	Feb. 7	Feb. 21
Effingham	Ramada Inn, Effingham	Feb. 8	Feb. 22
Fayette	Farm Bureau Building, Vandalia	Feb. 8	Feb. 22
Marion	Legion Hall, Kinmundy	Feb. 9	Feb. 23
Washington		Feb. 9	Feb. 23
Franklin	Farm Bureau Building, Benton	Feb. 10	Feb. 24
Jefferson		Feb. 10	Feb. 24
Calhoun-Jersey	Farm Bureau, Jerseyville	Feb. 14	Feb. 21
Vermilion	Redwood Inn, East of Danville, I 74	Feb. 14	Feb. 20
Schuyler-Brown	Farm Bureau Building, Mt. Sterling	Feb. 15	Feb. 22
Morgan-Scott	Blackhawk Restaurant, Jacksonville	Feb. 16	Feb. 23
Greene	Extension Office, Carrollton	Feb. 16	Feb. 23

CORN COUNT-DOWNS

Bond	Community Building, Greenville	Jan. 3	Jan. 17
Mason-Cass-Menard		Jan. 3	Jan. 17
Randolph	Farm Bureau Building, Sparta	Jan. 4	Jan. 18
Perry	Extension Office, Pinckneyville	Jan. 4	Jan. 18
Jasper-Richland	West Liberty Methodist Church, Olney	Jan. 5	Jan. 19
Clark		Jan. 6	Jan. 20
Grundy-Kendall	Farm Bureau, Morris	Jan. 3	Jan. 10

SOYBEAN DAYS

		<u>One Day</u>
Edgar	Masonic Temple, Paris	Jan. 6
Stark		Jan. 13
Pulaski-Alexander		Feb. 14
Clay		Feb. 16 (afternoon)
Macoupin	Farm Bureau Building, Carlinville	Feb. 17
Marshall-Putnam		Feb. 24

Don W. Graffis
Extension Agronomist

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AGRONOMY NEWS

crops and soils

February 13, 1967

No. 340

PREEMERGENCE HERBICIDES FOR SOYBEANS--1967

Over 2 1/2 million acres (42.5 percent of the total) of Illinois soybeans were treated with preemergence herbicides in 1966. About a dozen herbicides are presently advertised for soybeans. The farmer must keep informed as to which herbicide will best fit his situation. The selection of a soybean herbicide should be based on (1) weed species present and the degree of infestation, (2) soil type, (3) crop tolerance, (4) method and time of application, and (5) supply and availability.

Herbicides vary in the weed species they will control. For example, Treflan controls annual grasses, and is the best soybean herbicide for wild cane and Johnson grass seedling control. But it does not control jimsonweed, cocklebur, and velvetleaf. Ramrod and Radox control most annual grasses as well as pigweed. However, many of the broadleaved weeds are not controlled. Amiben controls many of the grasses and broadleaved weeds in soybeans, but annual morning-glory is a notable exception.

Each farmer must analyze his weed problems and find a herbicide which does the best job of controlling them. Illinois Circular 932, "Using Preemergence Herbicides," gives information on different herbicides and the weeds they will control. This publication is available from your county farm adviser. Herbicide labels usually give information as to which weeds are susceptible to the herbicide.

Sometimes variation will be found in herbicide performance and the rate of application with different soil types. Radox is more effective on dark prairie soils than on the light-colored timber soils. The application rates of Treflan and Lorox must be adjusted for soil type. Apply Treflan on light sandy soils at a half-pound per acre, and on dark heavy soils at one pound per acre. Lorox rates vary from one to two-and-a-half pounds per acre. The higher rates are used on the heavier soils that are high in organic matter.

Soybeans are occasionally injured by preemergence herbicides under certain conditions but usually outgrow the damage if the injury has not been severe. Alanap, Vernam, and Lorox are more likely to injure soybeans than Treflan or Amiben. But occasional injury does occur with Treflan and Amiben. Soybeans are rarely injured with Radox and Ramrod. Ramrod is presently cleared for seed beans only.

Formulation and method of application must also be considered. Liquid formulations are generally used for broadcast application; granular formulations, for band applications. Most materials, except Lorox, are available as granules and as spray formulations. Some materials are preferred as granules because of less irritation and greater convenience.

During the past two years, some of the more popular materials have been in short supply, due to increased usage. Thus, by necessity, selection may sometimes be based on availability as much as on any other factor.

Amiben, Treflan, and Randox are the preferred preemergence herbicides for soybeans in 1967. Ramrod has given good results, but must be used only where the soybeans will be harvested for seed and will not be used for food, feed, or edible-oil purposes. Alanap, Alanap +, and Lorox are considered less preferable because of lower crop-tolerance or more-variable weed control. Planavin, Dacthal, and Vernam are new herbicides that have clearance and are being tested.

The selection of a soybean preemergence herbicide should be like a prescription that is chosen to cure the problem. There aren't any herbicides which will act as a patent medicine cure-all. For further information, obtain the "1967 Guide for Weed Control in Field Crops" from your county farm adviser.

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AGRONOMY NEWS

crops and soils

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ALFALFA VARIETIES FOR 1967

Long- or Short-Term Stands:

A-59	Cayuga	} For Central and Southern Illinois only
525	Saranac	
Progress	Warrior	
Vernal	WL 303	
WL 202	Buffalo	
	Cody	

Short-Term Stands Only: (2 hay years or less)

Alfa	Europa
A-24	FD-100
Cardinal	Flamande SC 118
DuPuits	Glacier

Alfalfa fields that are expected to be productive for three or more harvest years should be seeded to varieties resistant to bacterial wilt and adequately winterhardy for the area. The varieties listed under "Long- or Short-Term Stands" are moderate to highly resistant to bacterial wilt, and are adequately winterhardy for all of Illinois with the exception of Buffalo and Cody. These two varieties are not as winterhardy as the others, and may be injured by cold temperatures when grown in Northern Illinois. The varieties listed under "Short-Term Stands" are not resistant to bacterial wilt, and may decline in productivity very sharply during the third production year when bacterial wilt is prevalent in the field.

All of these varieties are high yielding. The yields from various locations and several years show only a 10 to 12 percent yield difference from the lowest to the highest ranking variety.

Relative Yields, Tons Hay per Acre in Illinois

Variety	Northern Illinois	Central Illinois	Southern Illinois
Alfa	6.69	9.03	6.48
A-24	6.76	9.12	6.55
A-59	6.38	8.61	6.18
Buffalo	6.25	8.43	6.05
Cardinal	6.76	9.12	6.55
Cayuga	6.43	8.68	6.23
Cody	6.39	8.62	6.19
DuPuits	6.82	9.20	6.60
Europa	6.60	8.90	6.39
FD-100	6.74	9.10	6.53
525	6.62	8.92	6.40
Flamande SC 118	6.74	9.10	6.53
Glacier	6.68	9.01	6.47
Progress	6.56	8.86	6.36
Saranac	6.67	8.99	6.45
Vernal	6.41	8.64	6.20
Warrior	6.62	8.92	6.40
WL 202	6.49	8.76	6.28
WL 303	6.93	9.35	6.71

Yield is only one factor in selecting a variety. Disease resistance (particularly bacterial wilt resistance) is also an important consideration. Bacterial wilt affects the length of life of the alfalfa stand. Susceptible varieties growing on infected soil usually thrive for two production years, but suffer rapid stand loss and reduced vigor during the third year. A high level

of resistance to bacterial wilt is found in varieties such as Vernal and Cody; moderate resistance, in varieties such as WL 303 and Warrior. Flemish varieties (those listed under "Short-Term Stand" only) that have not been improved by plant breeders in the United States are very susceptible to bacterial wilt. Saranac and Warrior are examples of Flemish parentage with bacterial wilt resistance added by breeders in the United States.

Leafspot diseases are a problem every year. Infected leaves yellow, become brown-spotted, and many drop. Feed quality and yield are reduced. Many alfalfa varieties have some resistance to the more prominent leafspot diseases. Many new varieties have improved leafspot resistance. The Flemish varieties have more leafspot resistance than most other varieties.

Insects of major importance to alfalfa in Illinois are leafhoppers and alfalfa weevil. Pea aphids and spotted alfalfa aphid are occasional problems. The Flemish varieties and Vernal are more tolerant of leafhoppers than Ranger, Buffalo, and Cody. No variety is resistant to the alfalfa weevil. Alfalfa varieties with resistance to the alfalfa weevil may be available in 1971 to 1972.

Moderate resistance to pea aphid is reported for WL 303 and newer varieties currently being evaluated. The spotted alfalfa aphid has been a long-time problem in the West. Cody was developed with spotted alfalfa aphid resistance, and WL 303 has some resistance. Other varieties being developed and evaluated carry some resistance to this insect.

Winterhardiness is needed throughout Illinois. Southern commons (such as Arizona, Utah, and New Mexico) and California commons often lack enough cold hardiness to survive one winter. Kansas and Oklahoma commons usually survive well, except in Northern Illinois. The Dakota commons are very hardy, but are also low in yield. The "commons" are not suggested for hay crop or pasture seedings in Illinois. The varieties listed above are usually higher yielding.

As a group, the Flemish varieties are less winterhardy than varieties like Vernal that were developed in the United States. Many of the improved Flemish varieties have increased winterhardiness.

Select an alfalfa variety on the basis of how it will be used. Stands that are to last three years or more will need a variety having bacterial wilt resistance and adequate winterhardiness for the area. Stands that are to be used two years or less can use either bacterial wilt resistant or susceptible varieties. If the alfalfa is to be pastured, Vernal is a good choice because of its low set and broad crown. If spotted alfalfa aphid has been a problem in the area, Cody or WL 303 should be considered. Resistance to leafhoppers and leafspot diseases is needed. Resistance to pea aphid and other leaf and stem diseases is a bonus. Many varieties have moderate to high resistance to the major alfalfa production problems. Look for them!

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HERBICIDES FOR CORN-1967

In 1967, agronomists estimate that preemergence herbicides will be used on more than half of the corn acreage in Illinois. Though present herbicides are not totally effective, farmers have been quick to realize the benefits the chemicals offer. Herbicides help control weeds in the row, allow faster cultivation, and check weeds during wet weather when cultivation is impossible. On large acreages, herbicides also offer a flexibility that makes the time of cultivation less critical. Sometimes, the number of cultivations can be reduced. Preplant applications make it possible to get more jobs out of the way before planting. But this means broadcasting, rather than banding the material.

Atrazine is one of the most effective preemergence herbicides. It can be applied any time from two weeks before planting until three weeks after planting. Corn tolerance is very good. When rainfall is moderate or high, light incorporation after application doesn't seem to have much of an effect on performance. In dry seasons, incorporation has sometimes been beneficial.

Preplant or preemergence Atrazine applications are generally preferred to applications made after weeds are up. But when Atrazine is used as an early post-emergence (before weeds are 1 1/2-inches high), the addition of a nonphytotoxic oil to the amount of Atrazine normally recommended improves weed control. On a broadcast basis, one to two gallons of oil is suggested per acre, proportionately less when not broadcast. Oil is not added for preemergence applications.

Atrazine performs best on light, low-organic-matter soils. It is more effective on broadleaved weeds than on grass weeds. Sometimes, control of crabgrass, panicum, and giant foxtail is not as good as desired. However, Atrazine often works satisfactorily on moderately dark to dark soils. With appropriate rates, it controls many of the annual grasses as well as broadleaved weeds.

Because of possible injury from its residue, Atrazine should not be used where small grain is to be seeded the following spring. Injury may also occur on soybeans the year following application. When farmers use recommended rates and make accurate applications, injury to soybeans has not been a serious problem in Illinois.

Atrazine for corn is available from the manufacturer only as a wettable powder for spray application.

Applying Atrazine instead of water in fertilizer solutions may be convenient, but has not generally improved weed control. Any equipment used for applying Atrazine should be carefully checked and properly operated to assure good, uniform applications at the correct rate.

Ramrod. Farmers will use considerably more Ramrod in 1967. It is available both as granules and as a 65-percent wettable powder for spray application. It is more effective than Radox on light-colored, low-organic soils. It also performs well on dark soils.

Ramrod gives weed control a little longer than Radox and is less irritating. However, when handling and applying it, operators should still be careful to avoid contact. Mechanical incorporation of Ramrod into the soil is not currently recommended.

It should not be used where corn forage is to be fed to livestock. Ramrod can be used on soybeans raised for seed, but must not be used on soybeans raised for food or feed purposes.

Ramrod has been very effective for controlling annual grasses, even when there was limited rainfall. It also gives some control of pigweed and lambsquarter. But it does not control most other broadleaved weeds commonly found in corn. Where broadleaved weeds are also a problem, following Ramrod with an early, post-emergence application of 2,4-D provides a good program.

Although Ramrod lasts a little longer than Radox, persistence has not been great enough to cause problems in crops grown the following fall or spring.

Radox is available in liquid and granular form. It is best adapted to dark soils--where annual grasses such as foxtail are a major problem, or where it can be followed by an early, postemergence application of 2,4-D for control of broadleaved weeds. It is cleared for use on soybeans as well as corn. Precautions are necessary to avoid irritation to skin and eyes.

2,4-D ester is available in liquid and granular form. It controls annual grasses as well as broadleaved weeds, if rain falls soon after application. Easy to handle, 2,4-D presents no residue problems and is low in cost. However, it generally does not control weeds as well as the herbicides discussed above. Although usually not a serious problem, corn injury sometimes occurs. Only the ester--not the regular amine form of 2,4-D--should be used for preemergence application.

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HERBICIDE COMBINATIONS FOR CORN--1967

Although there are many possible herbicide combinations, only a few have performed well enough in corn fields to justify product development and clearance. Users should not attempt to concoct combinations which have not been adequately tested and approved.

Certain herbicide combinations permit control of more different kinds of weeds over a wider range of soil types and climatic conditions. They also sometimes reduce the possibility of injury to the present crop, or to later crops that might be affected by herbicide residues.

Ramrod plus Atrazine has performed well in research tests in many states, and is one of the most promising combinations. It is suggested for trial use in 1967. Although it looks good, don't go overboard until more field experience is recorded. The combination has been cleared; details for use should be available from Ramrod dealers.

For relatively dark soils, the recommended combination is: two pounds of Atrazine 80-percent wettable powder, plus 4 1/2 pounds of Ramrod 65-percent wettable powder; for light-colored soils, 1 1/4 pounds of Atrazine 80-percent wettable powder, plus 4 1/2 pounds of Ramrod 65-percent wettable powder.

The two herbicides compliment each other. Ramrod gives good control of annual grass weeds; Atrazine gives good control of broadleaved weeds. Ramrod performs well with relatively light rainfall. Atrazine holds up well under heavy rainfall and lengthens the control period. Since Ramrod performs best on dark soils and Atrazine, on light soils, the combination is adapted to a wider range of soils. This is especially helpful in fields containing several different soils. The Ramrod-Atrazine combination necessitates a spray application. More research is needed on the possibility of preplant applications and incorporation. Further tests are also needed on spraying Atrazine before or at planting, and applying the Ramrod as granules at planting time.

Roundup is a combination of Ramrod and 2,4-D. It is intended to control both grass and broadleaved weeds; it will be available in granular form, and it is suggested for trial use. Although it will help fulfill the demand for granules, the combination with 2,4-D will probably not be as satisfactory as Ramrod plus Atrazine. Both crop tolerance and the degree of weed control may be less.

Atrazine plus Lorox has often performed well, especially on the light-colored, low-organic-matter soils. Decreasing the amount of Lorox reduces the chance of corn injury. Decreasing the amount of Atrazine reduces the amount of residual carry-over. However, in the southern part of the state where this combination

has had the widest acceptance, very little small grain is seeded in the spring, so the residue problem has not been serious in that area. In the combination, Lorox may improve crabgrass and panicum control. But even decreasing the rate of Lorox does not completely eliminate the possibility of corn injury.

Radox-T is Radox with TCBC added, to improve broadleaved weed control. Although a fair amount of this combination has been used, corn is occasionally injured. Sometimes, residual amounts of TCBC affect soybeans the following year. A better alternative is to use Radox or Ramrod for grass weed control, plus an early postemergence application of 2,4-D for broadleaved weed control. Radox-T is used primarily in granular form. When handling and applying, precautions should be taken to avoid irritation to the skin and eyes.

Knoxweed is a combination of Eptam and 2,4-D. Eptam is used mainly for the control of annual grass weeds; 2,4-D, for control of broadleaves. Although injury to corn may occur when either of these products is used alone, injury from the combination has not generally been a serious problem. Although weed control is sometimes considered adequate, performance is not consistent. Similar products to Eptam are being tested in similar combinations. Knoxweed is available in both liquid and granular form.

Each of the herbicides or herbicide combinations for corn has its own advantages and disadvantages. Some of the factors to consider in selecting the best herbicide program for your situation would include these: crop tolerance; weeds to be controlled; time of application; soil type; handling precautions; and available forms of the product.

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THE INCORPORATION OF PREEMERGENCE HERBICIDES

Most preemergence herbicides are applied to the soil surface and are not incorporated. However, incorporation is beneficial for a few of them. For some, incorporation may result in decreased weed control or increased crop injury. With some herbicides, incorporation may not help or hinder very much and usually isn't worth the extra effort.

When herbicides are applied to the soil surface, some of the chemical may volatilize into the air and be lost. The volatility and rate of loss varies considerably for different herbicides. Being one of the more volatile herbicides, Eptam should be incorporated.

Light can cause the breakdown and inactivation of some herbicides by a process called photodecomposition. This appears to be one factor affecting Treflan. By working the herbicide into the soil where it is not directly exposed to light, the weed killing power is retained longer.

Although incorporation may be beneficial in reducing loss from the soil surface, it also has some possible disadvantages. The deeper a given amount of herbicide is incorporated (or the more soil it is mixed with), the more it is diluted. For example, if 3 pounds of herbicide are applied to the soil and mixed 1 inch deep, it will be much more concentrated than if it had been mixed 3 inches deep.

When incorporated, some herbicides may be more strongly attached to clay or organic matter, versus surface application that moves them into the soil with water. This greater adsorption on the soil particles may mean less availability for uptake by the weed seedlings, thus less control.

The primary use of Eptam in Illinois is for the control of wild cane and Johnsongrass seedlings in corn. Vernam is available for use on soybeans and is similar in some respects to Eptam. Some formulations of Vernam should be incorporated, according to label instructions. Although Knoxweed contains Eptam as well as 2,4-D, surface application has generally been recommended for it, rather than incorporation.

The major herbicide which should be incorporated is Treflan for soybeans. It can be applied within 6 weeks before planting. The manufacturer suggests that it be incorporated very soon after application, preferably in the same operation. Reportedly, Treflan is broken down by rays from the sun—even by certain rays which may pass through clouds on a cloudy day. However, if Treflan is applied in the evening when there are no rays from the sun, the time of incorporation would apparently be less critical.

Incorporating Treflan soon after application reduces its loss from the soil surface. Various types of equipment can be used. Power driven tillers should give relatively uniform incorporation, with one trip. But these are not readily available on most farms. Among those readily available, the disk is probably the most practical implement.

When a disk is being used, it should be operated as the Treflan is applied or very soon afterward (preferably within 20 or 30 minutes). This first disking helps to reduce herbicide loss from the soil surface. Anytime before planting, a second disking at right angles

to the first is recommended. This will help obtain a more uniform distribution of the chemical. It also helps reduce the possibility of soybean injury from concentrated spots or strips of herbicide. In addition, it helps assure a more uniform weed control.

Although field cultivators are becoming more popular on some farms, they often have not been as satisfactory as the disk for incorporating Treflan. The action of a "ro-wheel" on the planter varies considerably with soil conditions, probably not incorporating Treflan as much as desired in most situations.

How deep and how thoroughly a herbicide is incorporated will vary considerably with the type of equipment; its adjustment and speed; and the type and condition of the soil. With a disk, the majority of herbicide is probably incorporated to only about a third or half the depth of disking. To judge how well an implement is incorporating, observe its action and the movement of the soil.

Recently there has been increased interest in the incorporation of atrazine. This interest is brought about partly by increasing attention to preplant application of atrazine (applying atrazine within 2 weeks before planting). It is not essential that atrazine be incorporated. It has been applied for a number of years without incorporation. With adequate moisture, atrazine applied to the surface may work just as well or slightly better than if incorporated. However, when there is relatively little rainfall after application, shallow incorporation may be beneficial. The reason for this is not thoroughly understood. It may be due in part to moving the atrazine down into more moist soil. But if it is incorporated too deep, a dilution effect may result in poorer weed control.

The type of equipment used for incorporating atrazine seems to be less critical than with Treflan. The main objective should be to obtain a uniform and relatively shallow placement.

Remember that it is not essential to incorporate atrazine. Most band applications of atrazine at planting time would not be incorporated. If you want to apply atrazine before planting, it is probably best to accomplish most of your seedbed preparation before applying atrazine. Don't apply it before you plow.

In most cases, apply atrazine before or after the last tillage operation. For example, it might be applied on fall-plowed land and the seedbed disked once before planting. If you disk more than once, it could be applied before the last disking. Or it should be satisfactory to apply atrazine after the final seedbed preparation. This could be within 2 weeks before planting. If, by planting time, it appears that weed control is not satisfactory, a shallow disking or similar operation could control any weeds present. The atrazine, still present, then might give adequate control of the next growth of weeds.

Preplanting and incorporation of atrazine generally means broadcast application. If you plan to cultivate, it may be difficult to justify the higher cost of a broadcast application.

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SELECTING CROPS AND HERBICIDES FOR THE MOST EFFECTIVE WEED CONTROL

Got a bad weed problem? Consider what crops and herbicides will allow you to achieve the best control.

If you have a bad, annual morning glory problem in certain fields, try to plant corn in those fields. Then, you can use an early postemergence application of 2,4-D. This is one of the most effective and economical controls for annual morning glory. Or with corn, you could use atrazine. It should also give good control. Soybeans wouldn't be a very good choice where you have annual morning glory because the majority of preemergence herbicides for soybeans don't do a good job of controlling this weed. Corn with an early postemergence application of 2,4-D would also be one of the best bets for controlling cocklebur.

If you have a wild cane problem, one of your best bets would be to use Treflan and plant soybeans. If you feel you have to go to corn, Eptam would help control the wild cane. But there is some chance of injuring the corn with Eptam.

For Johnsongrass, Dowpon can be applied in the late summer, or in the spring when Johnsongrass has about a foot of good active growth. This helps control the old grass. But follow up with corn and Eptam or soybeans and Treflan for control of the seedlings. If you apply the Dowpon in the fall, you could use corn or beans. But if you don't get the Dowpon on until spring, you would need to delay planting until about the first part of June; soybeans would be more appropriate.

If you have a quackgrass problem, you'll probably get your best control by using the recommended program with atrazine and planting corn for two years. If you can't plant corn for two years, amitrole, amitrole-T, or Dowpon are other possibilities for controlling the quackgrass.

With foxtail, go to corn with Radox or Ramrod, or else soybeans with Treflan, Amiben, or Radox. These combinations would be among the best, but there are also several other herbicides that could be used.

For Canada thistle, you can use amitrole or amitrole-T before corn, but not before soybeans. These chemicals aren't very practical for Canada thistle in pasture, because you can't graze for eight months after treating.

If 2,4-D hasn't given good enough control of smartweed, try atrazine when you plant corn; for soybeans, try amiben.

Pigweed and lambsquarter can be controlled with nearly any of the preemergence herbicides for corn or soybeans.

For velvetleaf and jimsonweed, 2,4-D postemergence isn't a real good answer. Atrazine for corn or possibly a combination of atrazine and Lorox might do the

job. For soybeans, we don't have a real good answer for velvetleaf and jimson-weed. Sometimes amiben works fairly well. Lorox would help, if you're willing to risk some chance of soybean injury.

Nutgrass seems to be an increasing problem. Unfortunately, we don't have a real good answer for controlling it. Atrazine or Eptam (as preemergence applications) or Lorox (as an early postemergence) may help, but we would like to have a better control program for nutgrass.

Wirestem muhly is another problem weed for which we need a better control program.

Even without herbicides, adjusting your cropping program properly can be a big help. Where winter annuals such as mustards or wintercress are a problem, planting a row crop in the spring will break the life cycle of the weeds.

Winter wheat is a good competitive crop to help control annual weeds or perennials that come up from seed in the spring.

Winter wheat is one of the best crops to work into a Johnsongrass control program. It helps to control seedling Johnsongrass in the spring and allows the use of Dowpon after wheat harvest.

Decide what your major weed problems are in your various fields. Then, try to select the crops and the herbicides most likely to give the best control.

For more information on the control of specific weed problems, ask your county farm adviser for any of the following circulars:

Illinois Circular 892, *Controlling Quackgrass in Illinois.*

Illinois Circular 828, *Controlling Giant Foxtail in Illinois.*

Illinois Circular 827, *Controlling Johnsongrass in Illinois.*

Illinois Circular 932, *Using Preemergence Herbicides.*

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CAN HERBICIDES REPLACE CULTIVATION?

With improved herbicide performance and increasing interest in narrow rows, more farmers are thinking about broadcasting herbicides. The question naturally arises: "Is cultivation really necessary?"

Many studies in Illinois and elsewhere have shown that the major reason for cultivation is to control weeds. If weeds can be adequately controlled with herbicides, there is often little or no benefit from cultivation. This is particularly true on relatively dark soils--ones that are fairly high in organic matter and in good tilth. On light, low-organic-matter soils that tend to crust, there may be some benefit at times from stirring the soil, especially if it has been over-worked during seedbed preparation. One of the best ways to find out if cultivation pays on your soil is to try a broadcast application of herbicide on part of your acreage. If weed control proves adequate, cultivate only part of the area and check yields.

We are further along with corn than with soybeans. With atrazine (possibly with atrazine plus Ramrod or atrazine plus Lorox), we are often able to control the majority of weeds present for a fairly high percentage of the time during most of the season. Another possibility for controlling annual grasses is Ramrod followed by an early postemergence application of 2,4-D.

It's very true that broadcasting a herbicide (instead of banding) does increase the cost considerably. It may be difficult to justify replacing \$3 worth of cultivation with an extra \$6 worth of herbicide. (Costs will vary with the herbicides used, rates needed for the soil, etc.) But some farmers appear to be willing to take the step, if they can have reasonable assurance of success. Those on large acreages especially like the possibility of increased flexibility that broadcast herbicides might offer.

As more farmers turn to narrow-row equipment, they will stop and count the number of hoppers to keep full on a narrow-row planter. Where they used to have about 14 hoppers to keep full, they may now find nearly 24 or more. They will start asking: "Is there some other time for applying the agricultural chemicals?" This other time might well be before planting. That would mean broadcast application.

As they move to narrow rows, farmers on the darker soils may broadcast more herbicides. Farmers on the lighter soils may also move to broadcast herbicides because of the lower rates needed, thus lowering the herbicide cost for their soils.

Some farmers didn't use to think they had "done their just duty" unless they had cultivated corn three or four times. Illinois farmers now average about two row-cultivations. This may decline even further with an increased use of herbicides.

A rotary hoe or harrow is used on about three-fourths of the corn and soybean acreage in the state. This practice may continue to be popular for "touching up" places where the herbicides miss a few weeds.

For soybeans, a popular question is: "Can I drill beans 'solid' and forget cultivation, if I broadcast a herbicide?" Some of this interest has been generated by the introduction of Treflan, which is usually broadcast.

Treflan is one of the more consistent herbicides, giving control a high percentage of the time. It is particularly good for control of the annual grass weeds. However, it does not give good control of most of the broadleaved weeds commonly found in soybeans. Amiben controls many of the broadleaved as well as grass weeds, but it does not give good control of annual morning glory and is sometimes only fair for the control of velvetleaf, jimsonweed, and cocklebur. At the present time, we simply do not have a satisfactory program for soybeans to assure adequate control of the major broadleaved weeds.

Following a good, preemergence grass killer with a postemergence broadleaved weed killer might be one possibility. Use of 4-(2,4-DB) is helpful for control of a serious cocklebur problem. This may also help control annual morning glory and giant ragweed. But since there is some chance of injuring soybeans, this treatment is suggested only for serious problems and has found only limited use.

Tenoran is a recent introduction being evaluated for possible use as an early postemergence application in soybeans to control small broadleaved weeds. Further testing would be advisable to properly assess the seriousness of soybean injury that might result from the use of this herbicide. Further evaluation would also be helpful on the time and method of application, as well as on the species of weeds controlled.

Dinitro is one of the older herbicides that can be used as an early postemergence application in soybeans. But it is doubtful that much interest in the use of Dinitro will be revived in Illinois.

New herbicides, herbicide combinations, and improved application techniques may help us to find the solution to better broadleaved weed control in soybeans. When the answer is found, we may be back where we were years ago--drilling soybeans "solid." But for most situations at present, it would usually be wise to keep the soybean rows wide enough for cultivation as needed.

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POSTEMERGENCE HERBICIDES FOR CORN AND SOYBEANS

No. 347

The major herbicide used after the crop and weeds are up is still 2,4-D. The use of 2,4-D has remained relatively constant for several years with about 40 percent of Illinois' corn acreage treated.

The main point to remember about 2,4-D is that it should be applied early, when weeds are small and the easiest to kill. Don't wait until weeds are large and difficult to kill. They're already competing with the corn by that time. An application of 2,4-D can be made almost anytime to corn. Until the corn is about 8 inches high, 2,4-D can be broadcast over the top. After that, "drop nozzles" should be used to keep the 2,4-D out of the whorl.

Each year in late July or early August, a common question is: "Can corn be sprayed during tasseling or silking?" Whether corn is damaged by 2,4-D at that stage is somewhat controversial. However, the main point to remember for good weed control is that the spraying should be done much earlier.

Each year, some corn is damaged by 2,4-D. It is virtually impossible to eliminate all cases of 2,4-D damage. The chemical usually makes corn brittle for a week or ten days. If a strong wind comes up, some corn may be broken off; some may bend near the base ("elbowing").

To help avoid damage, be sure to apply 2,4-D at no more than the recommended rate. The recommended rates per acre for broadcasting are: 1/6 pound, low-volatile ester; 1/4 pound, high-volatile ester; or 1/2 pound, amine. If the application is not broadcast, apply proportionately less for the area actually treated. It is all right to direct nozzles in toward the row area, but be sure to adjust the rate so you don't apply excessive amounts to the corn.

Here's an easy way to calculate the amount of 2,4-D needed. If you use a formulation with 4 pounds of 2,4-D per gallon, each quart will contain 1 pound; each pint, 1/2 pound; and each half-pint, 1/4 pound. Thus, it would take 1 pint of amine formulation to get 1/2 pound of 2,4-D. A gallon of 2,4-D amine (with 4 pounds of 2,4-D per gallon) would be enough to broadcast 8 acres ($4 \text{ lb./gal.} \div 1/2 \text{ lb./A.} = 8 \text{ acres}$). A gallon of 2,4-D (containing 4 pounds of 2,4-D high-volatile ester) would be enough to broadcast 16 acres ($4 \text{ lb./gal.} \div 1/4 \text{ lb./A.} = 16 \text{ acres}$).

Try to avoid cultivation during the week or ten days after applying 2,4-D--particularly if the corn appears brittle and is so tall that it might be broken by the cultivator.

Since it is much less volatile than 2,4-D ester, an amine formulation of 2,4-D will help to reduce the possibility of injuring nearby, sensitive plants. However, fine-spray particles of either amine or ester can drift with wind. Therefore, try to spray when there is little or no wind. Using relatively low pressures (20 to 30 p.s.i.) and adequate water helps to reduce drift. Five to ten gallons of spray per acre is rather common.

During the past few years, there has been some use of *oil-soluble amine* formulations of 2,4-D. Esters are usually formulated in oil; most amines are not. Being formulated in oil, the oil-soluble amines are said to be about equal to esters in effectiveness. However, they are considered to have the safety features of other amines. The basic ingredient is still 2,4-D. As long as the appropriate rate is used, weed control has generally been comparable with that of other 2,4-D formulations.

Banvel-D (dicamba) has federal clearance for use as a postemergence treatment for corn. Intended primarily for the control of broadleaved weeds, it is similar to 2,4-D in some respects. Corn has relatively good tolerance to Banvel-D, at the recommended, postemergence rates. Banvel-D controls smartweed better than 2,4-D. Atrazine is also quite good for this purpose.

Although Banvel-D was only in limited use in Illinois in 1966, there were a number of cases of injury to soybeans near cornfields where this herbicide was used. Unless some solution can be found to reduce the risk of injury to soybeans, this herbicide will probably not be widely used in Illinois.

Atrazine can be used as an early, postemergence application (until weeds are 1 1/2 inches high, but within 3 weeks after planting). A regular, preemergence application at planting or shortly after (or possibly a preplant application) is generally preferred. But if the application is delayed for some reason, the postemergence treatment is often satisfactory. If atrazine is used after weeds have emerged, the addition of a non-phytotoxic oil will generally improve effectiveness.

For Illinois, the normally recommended rate for atrazine is suggested, regardless of the time of application. Reducing the amount of atrazine might offset the benefit from the oil. About 1 1/2 gallons of the non-phytotoxic oil should be added to the 20-to-30 gallon spray solution for each acre actually treated.

Several herbicides can be used (as directed) as a postemergence application for controlling weeds in corn--Lorox, Dowpon, and Clobber. Since corn can be injured, the treatments need to be applied very carefully. To obtain satisfactory control, weeds need to be relatively small--preferably less than 5 or 6 inches. Having corn at the recommended height and the weeds small enough makes timing quite critical. Most Illinois farmers seem to prefer other alternatives for controlling weeds in corn. The directed, postemergence applications have not become very popular. Weed-competition studies also indicate that it is best to place primary emphasis on early weed-control methods.

Soybeans may be treated with 4-(2,4-DB) from ten days before bloom to mid-bloom. This herbicide is primarily intended for use in controlling cocklebur. It may also give some control of annual morning-glory and giant ragweed. Since soybeans do not tolerate 4-(2,4-DB) real well, its use is suggested only as an emergency measure for a rather serious weed problem--like the ones sometimes found in bottomland areas. This herbicide may cause the soybean plants to wilt soon after application. Later injury may occur in the form of cracked stems and increased lodging, resulting in yield reductions. When used, label instructions should be carefully followed.

Tenoran is a new postemergence treatment being tested for soybeans. It is primarily designed for control of some of the broadleaved weeds that may escape present, preemergence herbicides. It should be applied before broadleaved weeds reach a height of 1 to 2 inches. The rate of *Tenoran* can be reduced by adding a surfactant, in accordance with label instructions. Timing is rather critical, and soybean tolerance is limited. Soybeans may show significant, early injury; but yields are not necessarily always affected. For those needing such a herbicide and interested in trying it, we would suggest trying it out only on a very limited basis, until more experience is obtained.

The rotary hoe and row cultivator are still among the most popular implements on Illinois farms. The rotary hoe or harrow is used on 80 percent of the corn and soybean acreage.

Use of the rotary hoe is most effective after the weed seeds have germinated but just before the weeds emerge (or very shortly thereafter). If a preemergence herbicide has been used and is giving good control, there is no need to rush in with a rotary hoe. But if the herbicide does not appear to be giving adequate control, or if a crust is preventing good crop emergence, the rotary hoe can help. Some herbicides such as Atrazine, Treflan, and Amiben should persist well enough to give control of the weeds that emerge after rotary hoeing.

Row cultivation is still used on 99 percent of the corn and 97 percent of the soybean acreage in Illinois. Corn and soybeans are cultivated an average of twice with a row cultivator. The main purpose of cultivation is to kill weeds. Where weeds exist in the crop row, adjust and operate the cultivator so that the soil is thrown into the row, covering and smothering the weeds. If you have used a pre-emergence herbicide, you probably will not need to set the shovels so close to the row. Also, cultivation will usually be faster and easier.

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AGRONOMY NEWS

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May 15, 1967

No. 348

1967 AGRONOMY FIELD DAYS

Attendance and interest have been running mighty high at field days for the past few years. We expect 1967 to be bigger than ever. Five days are scheduled for June. The calendar gives those scheduled later in the year. Plan now to attend the ones near you.

June 13: Brownstown Research Center--located just south of Brownstown, Illinois, in Fayette County. Tours will begin at 9:00 a.m., leaving continuously. Lunch will be available.

Pat Johnson always has a "bang-up" program for this one. He says the 80-bushel wheat yields of recent years are just the beginning. Come see how wheat looks with 0, 30, 60, 90, and 120 pounds of nitrogen per acre. Compare wheat plots with five rates of phosphorus and five rates of potassium. You'll see new varieties of alfalfa and small grains being tested. Weed control, insects, and diseases are just a few of the other topics that will be of interest to you.

June 15: Agronomy Day, Agronomy South Farm, Urbana. Ellery Knake will keep you posted on this one.

June 19: Newton Experiment Field, Jasper County, Illinois. The program begins (1:00 p.m.) at 1:00 p.m. with Pat Johnson, other agronomists, and farm advisers in the driver's seat. Fertilizer trials, weed control, new crop varieties, and other crop- and soil-management practices will be demonstrated and discussed. Come see how favorably the Cisne-type soils respond to good management.

June 28: Carlinville Experiment Field, Macoupin County. You can do a day's work (6:30 p.m.) and still attend this twilight meeting. It starts at 6:30 p.m. Les Boone, University of Illinois area agronomist, will tell you about the new fertility trials on wheat, corn, soybeans, and forages. You'll see comparisons of varieties and different cropping systems.

June 29: Northern Illinois Research Center, just north of Shabbona in DeKalb County. Derreld Mulvaney, University of Illinois area agronomist, and Elroy Golden, farm adviser, have made this an excellent meeting in recent years. About 800 farmers attended last year. You will see research trials with fertilizers, corn planting dates, small grains and forage varieties, and weed control. Insect problems and control will be discussed by an entomologist from the University.

Other meetings for later this year are given below. Come join the crowd!

July 27	Carbondale ^{2/}	1:00 p.m.
August 16	Dixon Springs	1:00 p.m.
August 22	Kewanee ^{1/}	4:30 p.m.
August 29	Aledo	6:00 p.m.
September 1	Belleville ^{3/}	1:00 p.m.
September 5	Carlinville	6:00 p.m.
September 6	Brownstown ^{1/}	9:00 a.m.
September 7	Toledo	1:00 p.m.
September 7	Carthage	6:00 p.m.
September 8	Oblong	1:00 p.m.
September 8	Hartsburg	1:00 p.m.
September 11	Newton	1:00 p.m.
September 13	Dixon	1:00 p.m.
September 14	Elwood	1:00 p.m.

1/ A meal will be served.

2/ Sponsored jointly by Southern Illinois University and University of Illinois.

3/ Sponsored by Southern Illinois University. Other meetings are sponsored by the University of Illinois. The Belleville meeting will be at the South-Western Farm Research Center, opposite the south gate of Scott Air Force Base.

Don W. Graffis and Fred L. Welch
Extension Agronomists

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Urbana, Illinois

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HONEYBEES FOR RED CLOVER SEED PRODUCTION

Illinois is the leading red clover seed state in the nation, producing about a sixth of the total crop. Despite this No. 1 ranking, per acre yields are far below their potential. They could be increased considerably--probably more than double--with some emphasis on pollination.

We may tend to class red clover as a minor crop now because alfalfa is replacing it in many farm rotations. However, about 150,000 acres are harvested for seed with an annual value of \$3 to \$4 million for this extra cash crop. Research in other states, particularly Ohio and Minnesota, has shown that adequate pollination and pest control will pay off in red clover seed production. Seed yields of up to 400 pounds have been the result. In comparison, Illinois averages about 75 pounds.

Beekeepers and producers generally do not understand the importance of honeybees for red clover pollination. The notion that honeybees do not pollinate red clover is a false one. The nectar in red clover flowers is more difficult for honeybees to reach than in most other pasture legumes because the deep florets are longer than their short tongues. However, honeybees visit the florets for pollen and whatever nectar they can reach as it rises in the corolla tube. Pollination of the flower takes place on each visit, whether the bee gets nectar or not.

Prior to mid-July, honeybees visit sweetclover and white Dutch clover, preferring them because of the amount of nectar available and the shorter florets. By the time the second crop or seed cutting of red clover is in bloom, these other clovers are drying up and honeybees visit it readily for pollen. The pollen is essential to the bee colony as a source of protein for rearing young bees. Most bees are "compulsive pollinators" for this reason.

Red clover will not produce seed without bees to transfer the pollen, and the potential yield depends on the number of bee visits. Bumblebees are efficient pollinators, but few in number in most areas. Wild, solitary bees are also good pollinators; but their numbers vary from year to year, making them unreliable. So the honeybee, which can be provided in large numbers at will, is the logical one to do the job.

Seed producers can expect to pay from \$6 to \$12 rental per colony for strong, well-managed bee colonies. However, they may prefer to pay a lower flat fee and a percentage of the seed yield. The latter arrangement allows the beekeeper to assume some of the risk.

If you plan to produce red clover seed, you should provide at least one strong hive of bees per acre. Two hives would greatly increase the chances of adequate pollination. Place the bees beside the field as soon as it shows 5 to 10 percent bloom on the second crop, not before. Bees placed too early orient to other crops and are slow to move to the red clover. If the field is more than 20 acres, or is very long, put the bees in two groups at each end of the field. They will also need a source of water, such as a nearby farm pond or a livestock tank with cork floats on which the bees can land. Control insects before the plants bloom to protect the bees from pesticide losses.

In conjunction with other good farm management, pollination can increase your cash returns. A modest increase of 100 pounds of seed will provide a worthwhile return per acre. The average 1959-64 price per 100 pounds was about \$26. The number of honeybees colonies in Illinois has declined considerably in recent years, and the present estimated number of 91,000 colonies is too low to provide sufficient bees for all our insect-pollinated crops. If you plan to maximize production and returns from red clover seed, you must provide honeybees beside the field where they will do the job.

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Department of Horticulture

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AGRONOMY NEWS

crops and soils

June 5, 1967

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JUN 15 1967

No. 350

AGRONOMY DAY--THURSDAY, JUNE 15, 1967

Got a hole in that profit pocket?

Want some new profit making ideas?



The welcome mat is out for you and we've got a program packed with new ideas to help you get more bushels in the bin and more dollars in your pocket. Some of the nation's top agronomists and scientists from related fields will have current recommendations. They'll also show you new ideas they're working on for your future.

PLACE: Agronomy South Farm, Urbana.

PARKING: Real handy, right at the South Farm.

TIME: Tours will start every 10 minutes, beginning at 7:00 a.m. The last tour will start at 1:00 p.m.

A complete tour takes 3 hours.

LUNCH AND REFRESHMENTS: These will be available on the grounds. If you're starting the tour after 10:30, we suggest you get a bite to eat before you hop on the wagon.

FLYING FARMERS: Real convenient, free transportation will be available for you to and from the University of Illinois Willard Airport, Champaign.

IF IT RAINS: Come to the southeast corner of Memorial Stadium.

THE PROGRAM: Alfalfa blends and forage mixtures. New varieties for soybeans, wheat, oats, alfalfa. How soon hybrid wheat? High-lysine corn--yield results and feeding trials. Two crops in one year. A new look at corn culture. Preplant herbicides for corn. The key to solid-drilled soybeans. Improved control of broadleaved weeds. How much and what kind of tillage for your soil? Recognizing and controlling field crop diseases. An up-to-the-minute report on the insect situation and controls. Anhydrous ammonia research. New breakthroughs in wheat fertility. How to play the weather odds.

AND ALSO: See the 92nd year of corn at the Morrow Plots, also the tillage experiments and equipment at the Agricultural Engineering Research Farm.

A NEW FEATURE: The tour moves fast, and you may not get all of your individual questions answered. So we'll have agronomists, soils and crops advisers, and an SCS representative at the Information Tent available for consultation. There will also be a display of publications you can read later for even more profit-making tips.

TO HELP ANSWER YOUR

INDIVIDUAL QUESTIONS: Experts will be on hand from closely related fields of agricultural engineering, animal science, and agricultural economics. They'll have displays and will have the time to visit with you about grain drying, new equipment, livestock, and management decisions. See the new corn-yield estimator developed at the U. of I.

We're looking forward to your visit. We'll even have friendly smiles at the front gate to greet you. Deans K. E. Gardner, J. B. Claar, and M. B. Russell will welcome you as you start your tour.

So, load up the family or some neighbors and come see us--Thursday, June 15.

Ellery L. Knake
Extension Agronomist

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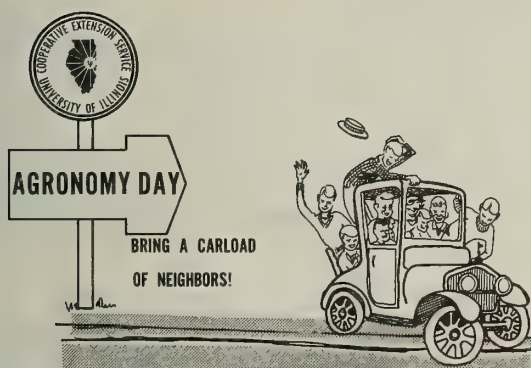


AGRONOMY NEWS

crops and soils

June 7, 1967

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COME TO AGRONOMY DAY

THURSDAY, JUNE 15

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AUG 10 1967

AGRONOMY SOUTH FARM
URBANA, ILLINOIS

HERE'S THE PROGRAM

- | | |
|--|--|
| 1. An Illustrious Past and Challenges for the Future | 10. What Tillage Practices for Your Soil |
| 2. Alfalfa Blends and Forage Mixtures | 11. Timing and Placement for Anhydrous Ammonia |
| 3. Alfalfa Varieties | 12. A Changing Corn Culture |
| 4. Fertility for 100-Bushel Wheat | 13. The Future of High-Lysine Corn Production |
| 5. Wheat Varieties and Hybrids | 14. Feeding Trials With High-Lysine Corn |
| 6. Soybean Varieties | 15. How to Play the Weather Odds |
| 7. Oat Varieties | 16. Current Insect Situation and Control |
| 8. Diseases of Agronomic Crops | 17. Weed Control in Corn |
| 9. Year-Round Cropping | 18. Weed Control in Soybeans |

ALSO: SEE THE 92ND YEAR OF CONTINUOUS CORN ON THE MORROW PLOTS, AND THE TILLAGE RESEARCH AND EQUIPMENT AT THE AGRICULTURAL ENGINEERING FARM.

U of I AGRONOMY DAY
URBANA, ILLINOIS
THURSDAY, JUNE 15



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AGRONOMY NEWS

crops and soils

June 19, 1967

No. 352

CONTROL FENCEROW WEEDS EASILY

If you're looking for an easy way to control weeds in your fencerows, try spraying. Farmers who have tried it are enthusiastic about the results. It will keep fencerow weeds from spreading to your fields, and it will keep your fencerows looking neat. Spraying surely beats struggling with a mower on a hot July day. It will also do a better job of keeping down regrowth and weed-seed production. The smaller the weeds, the easier they are to kill. June is usually the best time. If some regrowth occurs, you may want to spray again later in the summer.

Here's a good spray program:

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Put 50 gallons of water in your spray tank.

AUG 10 1967

Add 5 pounds of Dowpon (just as it comes from the container).

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Add 1 pound of 2,4-D. (That's the same as 1 quart if you're using 2,4-D with 4 pounds of active ingredient per gallon.)

This will give you enough spray to cover an acre of fencerow. That's about the same as 2 miles of fencerow 4 feet wide, or one time around 160 acres.

If there are any susceptible crops or plants in the vicinity, it would be safer to use the amine rather than the ester form of 2,4-D. Use a nozzle that will apply a fairly coarse spray. Some farmers use a regular garden hose nozzle. To help prevent drift, spray on a day when there is little or no wind. Dowpon and the amine form of 2,4-D don't volatilize like 2,4-D ester, so there isn't so much danger to nearby plants unless the spray is too fine and the particles drift to susceptible plants.

Dowpon controls grasses, and the 2,4-D controls broadleaved weeds. You can adjust the amounts of material given above to fit your specific situation. If the grasses are mostly annuals (like foxtail) and they are only 2 or 3 inches high, then 2 or 3 pounds of Dowpon should be enough. Lowering the rate should also reduce damage to desirable perennial grasses (bluegrass, brome grass, etc.). If you have perennial grasses like Johnson grass in the fencerow, you may want to increase the amount of Dowpon to about 10 pounds per acre.

If broadleaved weeds are your main problem, you could use 2,4-D alone without Dowpon. One pound of 2,4-D per acre should kill most broadleaved weeds without killing desirable grasses. If you have Canada thistles in your fencerow that 2,4-D won't control, you can spot-treat them with amitrole or amitrole-T. Remember, the smaller the weeds, the easier they are to kill.

Don't let your livestock graze fencerows treated with Dowpon, amitrole, or amitrole-T. Although 2,4-D is not highly toxic, it apparently makes some poisonous plants more palatable, so take precautions. Refer to product labels for more specific information on the use of these herbicides.

Soil sterilants, such as chlorate mixtures or high rates of atrazine or simazine, are sometimes used in fencerows to kill the vegetation for a longer time. But permanent sterilization may leave the ground bare and subject to erosion. It also tends to destroy wildlife cover. Most farmers prefer temporary treatment that will allow desirable vegetation to grow again in the fencerow.

In warm and moist weather, Dowpon and 2,4-D usually decompose well enough in 4 to 6 weeks to allow newly seeded grasses to grow. This fall, you may want to seed a desirable grass, such as brome grass, in the fencerow. A good competitive grass stand will help to keep out undesirable annual grasses and broadleaved weeds.

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No. 353

FREQUENCY AND HEIGHT OF GRAZING OR GREEN CHOPPING SORGHUM-SUDANGRASS AND SUDANGRASS

The highest yield of dry matter from sudangrass, sudangrass hybrids, and sorghum-sudangrass hybrids is obtained by one harvest at the end of the growing season, highest digestibility by very frequent harvests. Neither of these extremes is likely to satisfy the needs of most livestock men.

A moderately high digestibility with moderately high yield is the favorable compromise. Graze or green chop sorghum-sudangrass and sudangrass hybrids after they have reached a height of 24 inches and before they begin to head. Graze or green chop sudangrass varieties after they are 18 inches high and before they begin to head. A recent study has shown that the maximum yield of digestible dry matter from Piper sudangrass resulted from harvesting it when it was 24 inches tall at all cutting dates. The maximum yield of digestible protein was obtained by harvesting it whenever it reached an 18-inch height. Harvesting or grazing sudangrass that is 18 to 24 inches tall is likely to maximize animal production per acre. Maximum animal production from sorghum-sudangrass hybrids is expected to result from grazing or harvesting when the grass is 24 to 36 inches tall.

To reduce the possibility of prussic acid difficulties to near zero, the minimum desirable height of sudangrass, sudangrass hybrids, and sorghum-sudangrass hybrids before grazing is 18, 24, and 24 inches, respectively. This is particularly true and necessary for the first grazing period. Regrowth material is usually much lower in prussic acid potential. Poor growth (caused by drought, cold, and imbalanced fertility) tends to increase the prussic acid potential. Under poor growing conditions, excess nitrogen can also result in higher prussic acid levels. Prussic acid problems are not likely to occur with green chopped sorghum forage. Young plant material on which new growth is originating is the highest in prussic acid potential. Grazing animals tend to eat the tenderest forage--the tops of plants and where new growth is occurring. Green chopping mixes the newer growth material with older, thereby reducing the concentration of prussic acid in each mouthful of forage.

Apparently, ruminant animals are the only group of livestock particularly sensitive to prussic acid poisoning from sorghums. These animals can consume some prussic acid without having it affect their health. The problem occurs when a large quantity of forage that is high in prussic acid potential is consumed in a short period of time. Hungry animals are most likely to consume enough prussic acid-producing material in a short period of time to produce toxic effects.

Animal production per acre is greater from rotational grazing than from continuous grazing of sudangrass and related hybrids. Regrowths should be allowed to reach 18, 24, and 24 inches for sudangrasses, sudangrass hybrids, and sorghum-sudangrass hybrids, respectively, before starting a regrazing cycle. A grazing cycle should be 5 to 7 days of grazing, with a 15-to-21-day rest period. Three or four grazing strips are needed to work a rotating grazing scheme.

Grazing should be rather complete for good utilization. When 3 harvests were taken during the season, a short stubble of 3 inches has provided a higher yield than a 6-inch stubble for sudangrasses and sorghum-sudangrasses. When 4 harvests were taken, there was no difference in yield, whether cut at a 3- or 6-inch stubble height. Sudangrasses and sorghum-sudangrass reacted similarly to the different stubble-cutting heights. Clipping after each grazing period is important for weed control and uniformity of production.

In summary: Graze or harvest sudangrasses when they are 18 to 24 inches tall, sudangrass hybrids and sorghum-sudangrass hybrids at a 24-to-36-inch height. Rotate grazing. Use three to four strips, grazing 5 to 7 days each. Before grazing, allow the regrowth of sudangrasses to reach 18 inches, sudangrass hybrids and sorghum-sudangrass hybrids 24 inches. Clip after each grazing cycle, unless grazing action has been uniformly short (a 3-to-6-inch stubble) and weeds are no problem.

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No. 354

WILL CORN MATURE BEFORE FROST?

This is a question of concern each year when planting is delayed by spring rains. Whether or not late-planted corn will mature before frost depends largely on the date of the first killing frost. There is no direct relationship between planting date and maturity, because a 1-day delay in planting doesn't usually result in a 1-day later maturity.

The period from planting to pollination is fairly flexible. This period may be lengthened or shortened by cool or warm weather. Since the weather following late planting is usually warmer than that which follows early planting, corn planted as much as a week later may develop rapidly and pollinate within 1 or 2 days of the earlier corn. However, a delay in planting will result in a delay of pollination and maturity. And if planting is delayed past late May in the northern 2/3 of Illinois, wet corn is almost inevitable; there is also a real danger of soft corn.

We define soft corn as that which is caught by a killing frost before the moisture in the kernel has dropped to 30 percent. Wet corn has normally been defined as corn that fails to drop to a safe ear-corn storage moisture level (20 percent) by normal harvest time.

Moisture reduction in the corn kernel following pollination is caused by the deposition of starch, oil, and other corn kernel components. You might say that moisture is replaced by dry matter. The deposition of dry matter in the kernel is completed by the time the moisture content of the kernel is about 30 percent. For this reason, corn is commonly referred to as "mature" when it reaches this moisture content. The process is one of normal growth that takes 55 to 60 days from pollination, depending on the variety.

The time period during which the kernel is forming and maturing is not influenced so much by the weather as by the period from planting to pollination. However, excessive cloudy weather may slow down the process slightly, because of a reduction in the rate of photosynthesis as compared to full sunlight. Cool temperatures in August and September may also slow down the processes that convert sugar to starch, oil, and protein, thus lengthening the period. This happened in Illinois in 1966 and in 1967.

Moisture reduction in the corn kernel after maturity (30-percent moisture) is reached depends on the weather conditions. Moisture loss from the corn kernel during this period is similar to the evaporation of water from a pond or a pail. The rate of loss depends on air movement, air temperature, and the relative humidity of the air. The loss of water is relatively rapid when the air is warm and the relative humidity is low. It is slow when the temperature is low and/or the relative humidity is high.

Experience has shown that corn loses very little moisture after the middle of October. The major reason for this is low air temperature. The average mean temperatures for September, October, and November at Urbana, Illinois are 67°, 55°, and 41° F., respectively. The average maximum temperatures for those same months are 78°, 66°, and 50° F., respectively. The moisture-carrying capacity of cool air is quite low; after cool weather sets in about mid-October, corn drying proceeds slowly, if at all. Therefore, corn that pollinated in mid-July will be mature (30-percent moisture) by mid-September, and will normally dry to the safe ear-corn storage moisture level (20 percent) by mid-October. Late-planted corn that doesn't pollinate until in August still requires the 55 to 60 days to reach maturity, so it may be caught by an early freeze before maturity. Or, if it does mature before the first freeze, subsequent drying will usually proceed at a slow rate because air temperatures are relatively low, and you will then have a high-moisture corn problem.

How long can mature corn stand unharvested without excessive loss? Wind velocity, rainfall, and incidence of stalk rot are major factors influencing severe lodging of mature corn. While the weather cannot be predicted, you can make an estimate of the severity of stalk rot in your cornfield. After the crop is mature, cut into a few stalks near the base. Those infected with stalk rot will be discolored, and the pith will show disease damage or be almost nonexistent.

You need to check each field for stalk rot, because varieties differ in their susceptibility to the disease. Variations in fertility, soil type, and other environmental factors influence the prevalence of the disease. Fields showing evidence of stalk rot should be harvested first. A knowledge of the lodging resistance of the varieties you grow will help in deciding which should be harvested early and which may be left standing for awhile.

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Extension Agronomist

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crops and soils

No. 355

October 9, 1967

STORE HERBICIDES AND PESTICIDES SAFELY

With the close of harvest season and the approach of winter, it's time to check your pesticides to see that they are properly stored. Be sure to store them in a safe place so that children, pets, farm animals, and irresponsible people can't get to them. Then lock the storage place. If you don't have a separate storage room, you might consider building a low-cost wire cage.

Don't store herbicides close to food, feed, fertilizer, or other chemicals, such as insecticides. Some pesticides are volatile, and contamination might occur. Also check for open or broken bags and containers. Seal in original containers or discard. Tighten caps on bottles and cans.

Store pesticides only in the original containers. If the label is gone, dispose of the pesticide. If the label is not completely legible but you can tell what it is, ask your dealer for a new label. **DON'T STORE ANY PESTICIDE IN SOFT DRINK BOTTLES, HONEY JARS, OR OTHER CONTAINERS THAT CHILDREN MIGHT RECOGNIZE AS FOOD OR DRINK CONTAINERS.**

Store liquid herbicides, such as some of the 2,4-D concentrates and Treflan, at temperatures above freezing. If the basement is the only warm area, use some judgment about what materials to store there and how to store them. Although some herbicides are relatively nontoxic and are not very volatile, others could be a real problem, if a container should leak or break. Just a little 2,4-D escaping from a container in the basement might find its way to the living room of the house and damage house plants. And a broken jug of Radox in the basement would be mighty unpleasant company.

Freezing not only may break some containers, but also can cause some herbicides to crystallize or "salt out." Sometimes the frozen material will go back into solution after adequate warming and agitation, but it's best not to let them freeze in the first place. The use of held-over herbicides that have been frozen and later thawed may in some cases explain the lack of weed control. Most dealers know the effects of freezing and thawing, and they provide adequate storage facilities to prevent freezing. They also know what storage precautions to take with each specific material.

Store wettable powders and granular herbicides in a cool, dry place. The area doesn't need to be heated. But be sure that the containers are sealed and that the material doesn't get damp or wet. Also, don't store herbicides on oily floors.

When ordering your pesticides for next year, try to figure your needs closely enough to avoid having a lot of carry-over to store.

Now is also a good time to make a safety check of your spray equipment and order needed new parts.

Don't forget to drain and clean your spray equipment. Check the screens and clean or replace them as needed. Be sure to drain water from the pump and any other parts that could be damaged when water freezes. Lubricate when necessary. Check hoses and clamps. Replacing old ones can help you get the pesticide where it belongs instead of on yourself. Replace brass nozzle tips on herbicide sprayers after each one has been used for spraying 100 acres. Studies show that not only does the hole in the nozzle tip increase in size with use and wear, but the uniformity of the spray pattern can change, causing uneven application. Uneven spraying might affect weed control and could also increase the chances that certain herbicides might damage the crop. Nozzle tips cost so little that you will probably not have anyone giving you a high-pressure sales pitch to buy them. But you'll be doing yourself a favor to replace them.

Finally, check your supply of goggles, rubber gloves, and other protective clothing for handling pesticides. Order early so that you'll be ready to go in the spring.

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crops and soils

October 19, 1967

No. 356

SAFE USE OF SUDANGRASSES AND SORGHUMS AFTER FROST

Sudangrass, sudan hybrids, and sorghum-sudan hybrids that have been frosted are likely to have a higher prussic acid potential than before. Even though these levels are not likely to be dangerous, precautions should be observed. Whether the frosted sudans or sudan hybrids have dangerous levels of prussic acid depends on the level of prussic acid potential before the frost, the elapsed time since the frost, and the method of harvesting.

A hard frost increases the prussic acid potential of these sudans in the field 2 to 5 times. This increased level remains for 1 to 2 days, then declines rapidly. If the sudans were 18 to 24 inches tall and growing normally at the time of a frost, grazing and green chopping should be discontinued for 2 days. Plant material that was not ready for grazing before the frost (less than 18 inches tall or suffering from drought or nutritional imbalance) is not likely to be useable for grazing or green chopping for at least 3 days after the frost. As the leaves dry, the prussic acid dissipates. A second frost within a few days of the first hard frost may again result in increased prussic acid levels. It is advisable to avoid grazing the sudans for 2 days after each frost when the forage was useable before frost and for 3 days after frost if the forage had a questionable prussic acid potential before frost.

Ensiling sudangrass and related hybrids after the first frost results in a higher prussic acid potential than before the frost. These higher levels may be retained in the silage for 8 weeks or longer. To use ensiled frosted sudans of high prussic acid content, allow the silage to air-dry for 3 days before feeding. Ensiling these crops after the second hard frost has resulted in little if any increase in prussic acid in the silo, although the level of prussic acid in the forage at the time of ensiling was greater than it had been before the first frost. Forage of very low prussic acid potential can be ensiled after the second hard frost with little or no danger of prussic acid poisoning. Thus, additional drying is not necessary.

Prussic acid results from the digestion or breaking up of a plant glucoside dhurrin by a plant enzyme. In whole cells, these two plant-cell constituents are not in contact. Frost freezes plant cells, causing openings in the cell walls and intracellular structures and thereby allowing contact between dhurrin and the plant enzyme. The first frost of the season may not freeze all the cells of a sudan plant. Thus, a second frost can also result in a temporary increase in prussic acid release.

New tiller growth after early frosts can be more hazardous than the effects of frost on the older growth. New growth (in the spring, summer, or after a frost) is very high in prussic acid potential. Watch for new tiller growth, and remove livestock from pastures when this new growth is noticeable. Wait until these tillers are 18 to 24 inches tall before grazing or green-chopping again.

Cattle and sheep are most sensitive to prussic acid poisoning, because the enzyme that breaks dhurrin into prussic acid requires a slightly acid environment. The rumen provides this ideal condition. Monogastric animals with very acid stomachs (such as swine) rarely suffer from prussic acid, although cases have been reported. Prussic acid is hydrocyanic acid (HCN), which interferes in oxygen transfer by the blood of affected animals. An animal suffering from prussic acid poisoning shows indications of suffocation. The symptoms of prussic acid poisoning are very rapid or slow deep breathing, blue discoloration of the lining of the mouth, nervousness, trembling or jerky muscle movements, and spasms or convulsions at short intervals, until death caused by respiratory failure. Veterinarians have used methylene-blue and sodium thiosulfate to treat affected animals. Animals that are not in advanced stages of toxicity can be saved. The local veterinarian should be contacted immediately when prussic acid poisoning is suspected.

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Merry Christmas



AGRONOMY EXTENSION STAFF

Left to right (Front) D.W. Graffis, J.E. Dillon, S.R. Aldrich, M.D. McGlamery, M.G. Oldham, and L.F. Welch. (Back) W.O. Scott, L.V. Boone, E.L. Knake, W.M. Walker, W.R. Oswald, and M.D. Thorne.

Happy New Year

We send you GREETINGS and BEST WISHES for the Christmas Season and throughout the New Year.

We hope to see you at one or more of the meetings listed on the back in your area this year. The latest results and interpretation of research as it applies to Illinois Agriculture will be presented. Plan now! Watch for your Extension Adviser's announcement as to location and time of Agronomy meetings in your area.

January 2	/Monroe/Soil Use Pulaski-Alexander/Crops & Soils	January 30	/Logan/Corn & Soybeans Mason/Crops & Soils
January 3	/Clinton/Soil Testing & Weed Control Johnson-Union/Crops & Soils Perry/Crops & Soils	January 31	/Macon/Crops & Soils Tazewell/Crops & Soils
January 4	/Fayette/Crops & Soils Jackson/Pasture & Silage Franklin/Crops & Soils Macoupin/Soil Use & Testing	February 1	1/Crawford/Crops & Soils Marshall-Putnam/Crops & Soils
January 5	/Sangamon/Soil Use & Classification Christian/Crops & Soils Randolph/Crops & Soils	February 2	2/Hancock/Crops & Soils Jasper/Crops & Soils McDonough/Corn & Soybeans
January 8	/Grundy/Corn & Soybeans Will/Corn & Soybeans	February 6	6/Knox/Crops, Soils, & Insects Warren/Crops, Soils, & Insects Wabash/Crops & Soils
January 9	/Bond/Crops & Soils Coles-Cumberland/Crops & Soils Gallatin-Saline/Crops & Soils Morgan/Crops & Soils Sangamon/Crops & Soils	February 7	7/Edwards/Crops & Soils Fulton/Corn & Soybeans
January 10	/White/Soybeans & Corn Moultrie/Crops & Soils Hamilton/Crops & Soils	February 8	8/Henry/Crops & Soils Richland/Crops & Soils Stark/Crops & Soils
January 15	/Woodford/Crops & Soils	February 9	9/Mercer/Crops & Soils Randolph/Alfalfa, Clovers, & Grasses Rock Island/Crops & Soils Lawrence/Crops & Soils
January 16	/Cass/Crops & Soils Clay/Crops & Soils Lake/Crops & Soils Monroe/Weeds & Insects McHenry/Crops & Soils Menard/Crops & Soils Washington/Weeds & Insects	February 12	Grundy/Weeds
January 17	/DuPage/Crops & Soils Greene/Crops & Soils Jersey/Crops & Soils Jefferson/Weeds & Insects Marion/Soybeans Williamson/Crops & Soils	February 13	McLean/Crops & Soils Wayne/Crops & Soils
January 18	/Wayne/Weeds & Insects Vermilion/Crops & Soils Pike/Corn & Soybeans Massac/Crops & Soils	February 14	Jefferson/Crops & Soils
January 19	/Kankakee/Crops & Soils Edgar/Crops & Soils Adams/Crops & Soils Wabash/Weeds & Insects	February 15	Piatt/Weeds Washington/Crops & Soils
January 22 & 23	Champaign/Crops & Soils	February 16	Livingston/Corn & Soybeans Marion/Crops & Soils
January 26	/Ford/Corn & Soybeans Iroquois/Corn & Soybeans	February 22	Effingham/Crops & Soils
		February 27	Clark/Soybeans Carroll/Crops & Soils Schuyler/Pastures & Agr. Chemicals Whiteside/Crops & Soils
		February 28	Lee/Corn & Soybeans Ogle/Crops & Soils
		February 29	Winnebago/Crops & Soils Boone/Crops & Soils DeKalb/Crops & Soils Kane/Crops & Soils
		March 1	LaSalle/Crops & Soils
		March 5	Brown/Weeds
		March 6	Henderson/Weeds

These meetings will be presented by one or more Extension Agronomists from the University of Illinois. We will be looking for you!

Don W. Graffis
Extension Agronomist

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AGRONOMY NEWS

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January 18, 1968

No. 358

MAKE SPRING OATS PROFITABLE

High yield, not low expenses, is the key to profitable oat production. Major improvements in oat yields are possible by using good seed of the best varieties, planting early, preparing a good seedbed, using adequate fertilizer, and harvesting when ripe.

Oats are heat-sensitive plants. Hot weather at heading time results in poor seed set, and the grains that develop under hot weather conditions are usually low in test weight. Diseases also cause low-test-weight grains. Selecting a variety that will be heading before there is much 90° weather is the first step to higher oat yields. Early maturing oats should be grown in southern Illinois. Northern Illinois farmers can use the later-maturing varieties. Oat yields are usually higher in northern Illinois, resulting from the combination of cool temperatures in the late spring and early summer and the use of later-maturing varieties.

Diseases such as crown rust, leaf rust, stem rust, barley yellow dwarf, and smuts too frequently reduce the yield and quality of oats. Using disease-resistant varieties and seed treatment for smut can reduce many of these losses. The new oat varieties have improved disease resistance for most diseases. No one variety is completely resistant to all diseases.

Varieties that have performed well in northern Illinois are Jaycee, Shield, Garland, Tyler, Brave, Clintford, Clintland 64, and Newton. Yields in central Illinois have been less than in northern Illinois; however, the top-yielding varieties are: Jaycee, Garland, Brave, Shield, Newton, and Clintford. In south-central Illinois, the highest-yielding varieties in recent years have been Jaycee, Brave, Clintford, Putnam 61, and Shield. Two new varieties that may become important in northern Illinois are Portal and Holden. Portal has yielded particularly well in this area. Testing is underway on three other new varieties for northern Illinois--Orbit, O'Brien, and Stormont.

To get top yields, select one of the top varieties. Certified seed is your best guarantee of varietal purity. Sow only high-quality seed. The germination test is a good indicator of quality. However, weed seed, other crop seed, and foreign-material content are other, important factors that relate to seed quality. Read the seed tag. Use treated seed for the control of loose smut and other seed and soil-borne diseases. Treated seed can result in three or more additional bushels per acre at harvest. Plant in a good seedbed. A plowed seedbed is best. Fall

plowing is best where soil conditions permit; shredding corn stalks and a good disking is next best. Fertilize according to soil test and previous cropping history. Oats respond well to nitrogen and phosphorous. Although the response may not be large for potassium, it is a necessary fertilizer element and will be needed on soils testing low to medium in potassium supply. Plant as early as a good seedbed can be prepared. Planting should be completed before the average daily air temperature reaches 50° F. Yields often are 3 bushels less for each day planting is delayed after the best planting date. A 3- or 4-day delay in planting will delay maturity by about 1 day. Early planting is necessary to have the oats flowering before hot weather. Plant with a drill. This will mean 7 to 10 bushels more oats at harvest, versus broadcast seeding.

Don W. Graffis
Extension Agronomist

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crops and soils

March 20, 1968

No. 359

VOLUNTEER CORN IN SOYBEANS

Volunteer corn in soybeans may be more of a problem than usual in 1968, because of the late corn harvest last year, the increase in lodging (resulting in harvest losses), and the decrease in fall plowing. One of the best ways to avoid having volunteer corn come up in soybeans is to harvest as much corn as possible the previous fall. (When harvesting is delayed, corn lodging increases and more corn is left in the field. Unless this corn is gleaned or the viability of the seed destroyed, some of it may germinate the next spring to cause a problem, particularly in fields planted to soybeans.)

If the field is fenced, livestock can be turned in to glean the corn. This is one of the most practical ways to prevent volunteer corn. When the soil is fall-plowed and the corn is covered with soil, much of the corn left in the field will rot, destroying the viability of the seed. But, when ears are left on the surface and not turned under until about planting time, the seed may still be viable and may grow along with the planted crop. If you can plow sufficiently early in the spring, some of the corn still has an opportunity to rot. Or if planting isn't too early, much of the volunteer corn will germinate soon enough to be destroyed during seedbed preparation for soybeans.

The biggest problem can be expected where viable corn is left on the surface until just before the seedbed is prepared and all of the tillage and seedbed preparation takes place just before planting soybeans. Working the viable corn seed into the soil just before planting soybeans is one of the best ways there is to end up with a field of "succotash."

Even though some of the preemergence herbicides for soybeans may cause some injury to corn, none of the current ones can be expected to adequately control volunteer corn in soybeans. Amiben, although not recommended, has even had label clearance for use on fields planted to corn, so it's not much help for controlling volunteer corn; Treflan may cause some stand reduction and some injury to corn, so it can't be used for fields to be planted to corn; but Treflan does not kill corn well enough to suggest it for controlling volunteer corn in soybeans; corn is tolerant to Radox; alanap may have some effect on corn, but usually not enough to kill it or to prevent ears from forming; 2,4-DB or Tenoran will not handle volunteer corn, either. None of the contact killers have specific clearance for spot treating in soybeans.

Rotary hoeing isn't up to the job of removing a large-seeded plant like corn from soybeans. Row cultivation can control most of the volunteer corn, except that which got an early start with the beans directly in the row. This brings us to hand hoeing--still one of the most effective ways to rid soybeans of volunteer corn. The sooner you start, the less the "whack" required to chop off the corn

and the easier the job. But be sure to cut the corn below the growing point. If you can line up some help to get the hoeing done while you are still cultivating, fine. If you are the one elected for the job, give it top priority as soon as you are through cultivating. Maybe you can talk some of the family into some family "fun." This is one of the few jobs left where several members of the family can work side-by-side without the din and roar of machines, and it can almost be fun if everyone is in the right frame of mind. Some enterprising teen-agers have "contracted" with farmers to the mutual advantage of both. But go easy on Mom; let her bring out the lunch.

Perhaps with a little time left for thought before the spring rush, you can dream up some innovation to partially mechanize the operation as a few farmers have done. In the future, perhaps our corn breeders can develop a corn with seed that is not viable in the commercial production year. It doesn't have to be viable for livestock feed or for corn flakes.

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crops and soils

March 28, 1968

No. 360

SPRING WHEAT VARIETIES FOR ILLINOIS

Variety	Yield (bu./A.)		Test weight (1967)	Plant height (in.) (1967)
	(1967)	(1963-1967)		
Selkirk	32	36	56	37
Pembina	33	35	57	34
Chris	31	37	59	34
Crim	39	42	58	37
Justin	30	33	57	37
Lathrop	31	36	58	39

BRIEF DESCRIPTION OF VARIETIES

Selkirk was developed in Canada. It is beardless, has white chaff, and is medium in maturity and straw strength. It is moderately resistant to leaf rust; is resistant to stem rust, bunt, and loose smut; and produces a good yield of high-quality grain. It is suggested for planting because of good straw strength and disease resistance.

Pembina was released in Canada. It is an early beardless hard red spring wheat with white chaff that is rust-resistant.

Chris was released by Minnesota in 1965. It is a beardless hard red spring wheat of medium height and maturity, with moderately stiff straw. It is resistant to prevalent races of stem rust and leaf rust and to black chaff. It has good test weight and satisfactory milling and baking qualities.

Crim was released in Minnesota in 1963. It is resistant to stem rust, but it is susceptible to leaf rust and loose smut. It is about the same as Lee in straw strength. Its quality is satisfactory.

Justin was released in North Dakota in 1962. It is a hard red spring wheat with good milling quality. It is resistant to strain 15B stem rust and to black chaff. Yields have been slightly lower than those of some other varieties.

Lathrop was released from Wisconsin in 1961. The variety is similar to Henry, plus fly resistance. Lathrop is a feed wheat.

HAZARDS OF PRODUCING SPRING WHEAT

Scab a fungus disease, is an ever present threat to spring wheat in Illinois. Damage depends on the environment, especially the temperature and moisture relationship during heading and early seed development. Spring wheat should not follow a cereal crop unless all residues, stalks, and straw are completely covered when plowing. Scab not only reduces the yield of the grain, but also seriously lowers market quality and feeding value. Hessian fly and/or chinch bugs can be a serious threat if spring wheat follows or is close to an infested wheat field. Hot, dry weather can force it into maturity prematurely, thus reducing yield and weight per bushel.

Spring Wheat Is Suggested Only in Northern Illinois.

Prepare a good seedbed...treat seed...plant early.

*J.E. Dillon
C.M. Brown
R.O. Weibel
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crops and soils

March 28, 1968

No. 361

RED CLOVER--BROWN STEM ROT OF SOYBEANS?

Plant Pathologists and Agronomists at the University of Illinois have received numerous requests for information about the effect of red clover on the buildup of brown stem rot in soybeans. The fungus that causes brown stem rot in soybeans has been found on red clover. We have no evidence that red clover influences the buildup of brown stem rot of soybeans in normal rotations.

Usually, corn is an intervening crop between red clover and soybeans. It is desirable to grow corn after a legume such as red clover to utilize the nitrogen stored symbiotically by the red clover and to break the chain in the buildup of many pathologic organisms. The soybean plant can symbiotically fix its own nitrogen, thus does not benefit greatly from nitrogen stored by red clover or other legumes.

Since red clover can be infected by the fungus causing brown stem rot of soybeans, we suggest that soybeans not follow red clover directly. Crop rotation is the only method of controlling brown stem rot of soybeans today. Brown stem rot has become an important disease only where soybeans have been grown continuously for several years, or where they have been grown repeatedly in short rotations. The rotation should have one or more years of corn, small grain, or sorghum immediately preceding the soybean crop. Red clover has a place in rotations on Illinois farms, particularly where followed by corn or sorghum.

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Don W. Graffis
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crops and soils

NA, ILLINOIS

April 4, 1968

No. 362

PREPLANT HERBICIDES FOR CORN

Recent research and field experience indicate the feasibility of applying some herbicides prior to planting, where you wish to commit yourself to broadcast application.

Atrazine is the major preemergence corn herbicide currently available for pre-plant application. Early-spring and even fall applications have been tried; however, for corn, research indicates that the closer to planting time Atrazine is applied, the more successful the application is likely to be. Make applications no earlier than two weeks before planting.

Apply Atrazine to the soil surface or incorporate it lightly with a shallow disking or similar operation. The field cultivator has been successfully used for incorporation, but results have not always been quite as good as with a disk. The depth and thoroughness of incorporation will depend on many factors--type of equipment, depth of operation and other adjustments, speed, soil texture, and the physical condition of the soil at the time of incorporation.

With so many factors involved, exact specifications for incorporation cannot be given. However, one principle to keep in mind is that the deeper the herbicide is incorporated and the more soil it is mixed with, the more dilute it will be. Excessive incorporation and dilution may decrease the effectiveness of the herbicide. As a rule of thumb, incorporation devices (such as a disk) usually move the herbicide only to about $1/3$ to $1/2$ the depth at which the implement is operated.

The major reason for incorporating some herbicides is to reduce the loss of the herbicide from the soil surface. Since loss of Atrazine is not very rapid, incorporation is by no means essential. Another advantage for incorporating some herbicides may be moving the herbicide into soil where there is sufficient moisture for weeds to absorb the herbicide.

Atrazine is very effective for control of many broadleaved weeds, and is often quite satisfactory for control of annual grass weeds. However, under unfavorable conditions, it may not adequately control some annual grasses such as giant foxtail, crabgrass, and panicum. Considerable research has been done in the attempt to find another herbicide that could be combined with Atrazine to improve grass control.

Atrazine plus Sutan (R1910) was one of the more-promising combinations tested in research during 1967 for incorporated preplant application. If sufficient label clearance is obtained, and if further test results are favorable, this combination may find some use by those desiring a preplant incorporated combination.

Research suggests that other herbicides for possible combination with Atrazine, such as Ramrod or Lorox, often do not maintain their effectiveness sufficiently when incorporated.

In the future, combinations such as Atrazine and Ramrod or Atrazine and Lorox might be applied after final seedbed preparation just prior to planting; but research suggests they should not be incorporated. Present labels do not specify preplant application for Ramrod or Lorox, alone or in combination with Atrazine.

Preplant-incorporated applications offer an opportunity for applying herbicide, liquid fertilizer, and possibly insecticide at the same time--if the chemicals are compatible, and if the incorporation gives the proper placement for each chemical. Check labels for specifics.

Preplant applications offer an opportunity to make some herbicide applications before the busy planting season. This could be particularly advantageous for custom applicators and for farmers with large acreages; it would require fewer attachments on the planter. However, the weather will often dictate the actual time for application. So where preplant applications are planned, you should also have an alternate plan, in case the preplant application is not possible.

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M.D. McGlamery

Extension Agronomists, Weed Control

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No. 363

INDEX TO AGRONOMY NEWS 301 to 372

This index to current *Agronomy News* issues can serve as a handy guide to make your personal set a more-useful reference. If you would like any of these back issues, send us a card giving numbers and titles, and we will send them to you.

CORN *NUMBER*

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crops and soils

April 18, 1968

No. 364

PREEMERGENCE HERBICIDES FOR CORN--1968

In 1968, agronomists estimate that preemergence herbicides will be used on more than half of the corn acreage in Illinois. Although present herbicides are not totally effective, farmers have been quick to realize the benefits these chemicals offer. Herbicides help control weeds in the row, allow faster cultivation, and can control weeds during wet weather when cultivation is impossible. On large acreages, the control provided by the use of herbicides adds flexibility to the farmer's schedule, making the time of cultivation less critical. Sometimes, even the number of cultivations can be reduced.

Atrazine is one of the most popular herbicides for corn. It controls both broad-leaved and grass weeds. It is particularly effective on many broadleaves like smartweed. Corn has very good tolerance to preemergence applications of Atrazine. It is most effective on light soils that are relatively low in organic matter, but is also effective on soils with more organic matter if the rate is increased. Do not exceed the rates specified on the label, however.

Atrazine will often persist long enough to give weed control for most of the season. But unless you take proper precautions, enough Atrazine may remain in the soil to damage some crops the following season. Wherever you apply Atrazine in the spring, do not follow that fall or the next spring with small grains, small seeded legumes, or vegetables.

Soybeans planted where Atrazine was used the previous year may show some effect, especially if more than the recommended amount was used or if some areas received excessive amounts (the ends of fields, for instance). However, where the recommended rates of Atrazine are carefully and accurately applied, soybeans usually have not been damaged enough to affect yields significantly in Illinois research trials.

You can use Atrazine on most types of corn, including field corn and silage corn, as well as on seed-production fields, sweet corn, and popcorn. For use on corn, Atrazine is available from the manufacturer only as a wettable powder for spray application. Mix adequately, provide adequate agitation, and follow other precautions on the label to assure uniform application.

Ramrod (propachlor) has given very good control of annual grass weeds, often providing better initial control and usually for a little longer than Randox. Ramrod has also controlled pigweed and given fair control of lambsquarter. It performs best on the darker soils of the state, but also does well on lighter soils.

Corn has good tolerance to Ramrod. It is cleared for field corn, hybrid seed-production fields, silage corn, and sweet corn. There is no longer any restriction on grazing livestock after the corn harvest.

Ramrod is available as a 65-percent wettable powder and as 20-percent granules. Ramrod is not as irritating to handle as Radox, but do take precautions to avoid irritation to the skin and eyes. Some individuals are more sensitive than others to such irritation.

A good program is to use Ramrod (as a spray or as granules) at planting time for control of annual grass weeds, followed with an early postemergence application of 2,4-D to control broad-leaved weeds.

Radox (CDAA) is approved for field corn, hybrid seed corn, sweet corn, and popcorn. It is adapted primarily to the darker soils that contain a moderate to high amount of organic matter. Do not use Radox on sandy soils. It controls annual grass weeds and pigweed for about four weeks. Preemergence application of Radox can be followed with early postemergence application of 2,4-D, in order to improve broad-leaved weed control. Most Radox is used in granular form to reduce irritation. But even with granules, be careful to avoid irritation to the skin and eyes.

2,4-D ester is available in liquid and granular form. If rain falls soon after application, 2,4-D can control annual grasses and broad-leaved weeds. Easy to handle, 2,4-D presents no residue problems and is low in cost. However, it generally does not control weeds as well as the herbicides discussed above. Although injury to corn is usually not a serious problem, it does occur sometimes. Only the ester--not the regular amine form of 2,4-D--should be used for preemergence application.

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PREEMERGENCE HERBICIDE COMBINATIONS FOR CORN

Each herbicide has its own advantages and disadvantages. Some are best for controlling grass weeds, others are best for broadleaves. Some are best on light soils, others on dark soils. Rainfall requirements differ. Some "hold up" better than others under heavy rainfall. Some do not persist long enough to give weed control for the entire season; others may persist longer than desired, affecting later crops. Herbicides with limited crop tolerance may be more acceptable when mixed at a reduced rate with another herbicide that has better crop tolerance.

Considerable research has been done on herbicide combinations, seeking better control of a greater number of different weed species, on a wider variety of soil types and under a broader range of weather conditions. An appropriate length of control can sometimes be achieved, while minimizing herbicide residue. Of the hundreds of possible combinations, only a relative few have "made the grade" and have been cleared.

Since some combinations may increase the possibility of crop injury or give poor weed control, farmers are advised to use only those combinations that have been adequately tested and approved. Some combinations are prepackaged, while others need to be mixed at time of application.

Ramrod plus Atrazine, each at a reduced rate, can control both annual broad-leaved and grass weeds. This combination has given good weed control in research and in field trials. For the combination, 4 1/2 pounds of Ramrod 65-percent wettable powder is suggested, regardless of the soil type. The amount of Atrazine to add will vary with the type of soil--1 1/4 pounds of Atrazine 80-percent wettable powder for the light-colored soils that are low in organic matter, 2 pounds for the darker soils. The reduced rate of Atrazine will control many broad-leaved weeds, such as pigweed and smartweed, but may be marginal for the control of some, like velvet-leaf. The reduced rate of Ramrod in combination is adequate for the control of many annual grasses. The mixture controls broad-leaved weeds better than Ramrod alone, and often controls annual grass weeds better than Atrazine alone. The mixture reduces the Atrazine residue problem, and gives more-consistent control on the darker soils (or with limited rainfall) than does Atrazine alone. The Atrazine-Ramrod combination has been one of the better combinations tested; it is preferred over most of the others listed below.

Roundup is a combination of Ramrod and 2,4-D. It is available as a wettable powder or in granular form. It has given reasonably good early weed control. Although there is some chance of injury to corn from the 2,4-D, this has not presented a serious problem.

Knoxweed is a combination of Eptam (EPTC) and 2,4-D. It is cleared for use on field corn, sweet corn, and silage corn. Do not use it on seed-production fields. Although the possibility exists of injury to corn, this has not been a serious problem. Knoxweed presents no hazard to crops the next season. It is available in both liquid and granular forms. Do not use it on peats, mucks, or sands. Knoxweed has given somewhat erratic weed control, depending on rainfall and soil moisture. Greater consistency in weed control is likely when rain occurs soon after application.

A combination of *Atrazine plus Lorox* (linuron) has been available as a prepackaged, wettable-powder mixture. It can also be "tank-mixed" on the farm for preemergence use on field corn. This combination has often given satisfactory weed control, especially on relatively light-colored soils that are low in organic matter. Using a lower rate of Atrazine in the combination lessens the chance of residue problems with Atrazine on later crops. Using a reduced

rate of Lorox in the combination reduces, but does not eliminate, the possibility of corn injury. Do not use the combination containing Lorox on sandy soils; injury may result. Adjust rates carefully for the particular soil type.

A combination of Lorox and Ramrod, referred to as *Londax*, has recently received federal clearance for use on corn for grain. It contains Lorox and Ramrod in a ratio of 1 to 2 parts, respectively, of active ingredients. This combination has given relatively good weed control in research trials. The control of broad-leaved weeds is better than with Ramrod alone. However, the addition of Lorox presents the chance of some crop injury.

Randox-T (CDAA-T) is cleared for field corn, silage corn, sweet corn, and popcorn. Occasionally, it causes injury to corn; sometimes the "T" part may carry over in the soil, causing injury to soybeans the following season. Like Randox, it is irritating to handle, so most of it is used in granular form. Take appropriate precautions when handling.

Randox-T controls broad-leaved weeds a little better than Randox. However, a preferred alternative would be to use Ramrod or Randox for the control of annual grass weeds, followed with an early postemergence application of 2,4-D for the control of broad-leaved weeds.

Primaze is being introduced by the makers of Atrazine as a prepackaged combination of Atrazine and Caparol (prometryne) in a 1-to-1 ratio. With a reduced rate of Atrazine, Primaze might reduce the possibility of herbicide residue affecting subsequent crops. However, Illinois trials suggest that the addition of Caparol may reduce crop tolerance and the degree of weed control, compared to a full rate of Atrazine alone.

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AGRONOMY NEWS

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SUMMER ANNUALS FOR SUMMER FORAGE

For very high yields of forage for a short period of time (July through August), the Sudangrass, Sudangrass hybrids, and sorghum-Sudangrass hybrids are hard to beat. These crops can yield 4 to 8 tons of dry matter--depending on growing season, fertility, and harvesting system. Their total seasonal yield is seldom greater and usually less than the total seasonal yield from established alfalfa. Even spring-seeded alfalfa may equal the yield of these Sudan groups when conditions are favorable and establishment practices are well managed.

The demand for high forage yields from pasture or green chop through the months of July and August can be satisfied in part by Sudangrass, Sudangrass hybrids, or sorghum-Sudangrass hybrids. Many sorghum-Sudangrass hybrids are available, and their yields have not been greatly different. The sorghum-Sudans have been particularly high yielding when grazed or harvested only two or three times during the season. They need to grow taller between harvesting periods, in order to obtain superior yields over Sudangrass and Sudangrass hybrids. The sorghum-Sudangrass hybrids are better suited to a green-chop harvesting system than to a grazing system.

Sudangrass and Sudangrass hybrids are similar in growth. Occasionally, the hybrids are higher-yielding. Yield is not reduced as much by frequent harvests with the Sudan and Sudan hybrid group as with the sorghum-Sudan hybrids. The total seasonal yield of Sudangrass and Sudangrass hybrids is usually greater than the sorghum-Sudan hybrids under four or more harvests or grazings per season. Sudangrass and Sudangrass hybrids are more suitable for grazing than the sorghum-Sudangrass hybrids, and they may be equal to the sorghum-Sudangrass hybrids in a green-chopping program if frequent harvests are made.

Harvesting or grazing should be started when Sudangrass is 18 to 24 inches tall; Sudangrass hybrids when 20 to 24 inches tall; and sorghum-Sudangrass hybrids when 24 to 30 inches tall. Graze intensively so the top growth will be removed rapidly. Use rotational grazing for higher yields and higher-quality forage.

The summer annual crops are easily established. A well-prepared seedbed is desirable, preferably plowed and worked down until it is fairly firm. However, a well-disked soybean stubble--where the residue is well incorporated--should also be satisfactory. A weed-free, firm seedbed that has enough loose soil to cover the seeds 1/2 to 1 inch deep is ideal. Since these crops are of the sorghum family and are warm-season crops, they should not be planted until the soil temperature at the 4-inch depth has reached 60° F. and is not likely to drop below this temperature. Early May in southern Illinois and late May in northern Illinois are good target dates for planting sorghums.

Phosphorus and potassium fertilization for high-yielding Sudangrass, Sudangrass hybrids, and sorghum-Sudangrass hybrids should be done as if you were growing corn. Most or all of the phosphorus and potassium needed (as shown by a soil test) should be worked into the seedbed after plowing. A starter fertilizer equivalent to 200 to 300 pounds of 5-20-20 or 5-20-10 should be used on low-fertility soils. Sudangrasses sown on soils having a high-fertility status may show little benefit from starter fertilizer.

Split the nitrogen application. Apply a third to a half before planting and work it into the seedbed with the phosphorus and potassium. The remaining nitrogen should be applied after the first and second harvests. A total of 150 to 250 pounds of nitrogen is needed for top yields. Seasonal yields are not likely to be changed much if the nitrogen is all applied before planting, or in split applications. But, the nitrate-nitrogen and prussic-acid potential of the forage is higher when the nitrogen is applied at one time before seeding, rather than in split applications.

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May 16, 1968

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PLAN NOW FOR SUMMER FORAGE FROM PERENNIAL PASTURES

When summers are dry and hot, pastures turn brown and stop growing. We may then look at the lush green pasture of our neighbor and wish we had planned differently last spring. There are several ways to obtain productive pastures throughout the summer. Fertilizing a pasture composed of vigorous plant species will keep pastures greener and more productive later into the hot, dry periods of summer.

Kentucky bluegrass does not grow well under high temperatures. Bluegrass doesn't make much growth from mid-July to mid-August or early September, unless the summer is cool or rains are frequent (providing moisture for plant growth and cooling the plant and the soil through evaporation). Applications of 60 to 75 pounds of nitrogen in the early spring, just before growth begins, will increase spring production and bring on the pasture earlier. Fertilized bluegrass will grow later into the hot summer, but usually is not able to continue growth throughout the summer. Phosphorus, potassium, and lime should be applied when soil tests show a need. Fall applications of the needed phosphorus and potassium and small amounts of nitrogen stimulate fall growth and strengthen the grass for winter to keep it vigorous for early spring growth.

Timothy responds to heat and drought like Kentucky bluegrass. But timothy is a more-vigorous grass and will give a profitable response to 100 pounds of nitrogen per acre, if this is applied in the early spring. Smooth brome grass pastures are a little more heat- and drought-tolerant than timothy and bluegrass, but are still not able to grow vigorously through the hot, dry summers of central and southern Illinois. Smooth brome grass will usually provide a fair amount of pasture throughout the summer in northern Illinois. Fertilizing smooth brome grass in the early spring with 75 to 100 pounds of nitrogen (and an additional 50 to 75 pounds after the first grazing or harvest) will increase yields or carrying capacity and lengthen the production season.

Orchardgrass and tall fescue are more tolerant of heat and drought than bluegrass or timothy. They respond very well to an application of 75 to 100 pounds of nitrogen in the early spring and 75 to 85 pounds more after the first grazing or harvest. Tall fescue growth in mid-summer is lower in palatability than the spring or fall growth. Usually, an alternate pasture is desirable during this period. Orchardgrass and tall fescue in adjoining fields establish a convenient rotational grazing system that is desirable for both species.

Fertilization alone may not provide the amount of pasture needed throughout the summer. Special pastures seeded to plants that are heat- and drought-tolerant may be necessary.

Deep-rooted perennial legumes like alfalfa, birdsfoot trefoil, and crownvetch are the most versatile. They provide forage from the middle of May or early June to the first or middle of September. Annual lespedeza can provide high-quality and moderate amounts of summer forage throughout the southern quarter of Illinois. Lespedeza's low yield potential discourages the extensive use of this species.

Vigorous perennial legumes like alfalfa and red clover can be seeded in April or very-early May on a prepared seedbed with a grain drill or cultipacker seeder without a companion crop, obtaining 1 1/2 to 2 tons of hay crop or its equivalent in pasture 60 to 70 days later. Seedlings made the first of May are ready for harvesting or grazing about the first of July. Weeds are the chief problem with spring seedlings made without a companion crop. Two herbicides 4,2-4DB (commercially available as Butyrac or Butoxone) and EPTC (Eptam) have been used by the University of Illinois to successfully establish alfalfa and certain perennial legumes in the spring. The 4,2-4DB is a postemergence herbicide to be applied after the alfalfa, red clover, or birdsfoot trefoil have emerged and while the weeds are less than 3 or 4 inches tall. Most broad-leaved weeds are controlled very well. Smartweed is a broad-leaved weed that is difficult to control with 4,2-4DB. Apply the herbicide when smartweed is very small. Crownvetch is not tolerant to 4,2-4DB but is tolerant to Eptam.

Eptam is a preemergence herbicide, and it must be incorporated into the soil, through disking or the like. Eptam can be used with all the common perennial legume forages, but it will kill the grasses. Thus, only pure legume seedings can be made with Eptam. Another chemical, Balan, has been given label clearance for use as a preemergence herbicide with perennial legumes.

Rotational grazing improves summer production, total seasonal production, and the long-term survival of perennial legumes (alfalfa, birdsfoot trefoil, red clover, and crownvetch) and most perennial grasses. Kentucky bluegrass is an exception. Rotational grazing is necessary for the other perennial forages during the year of seeding and the years that follow.

The best time to fertilize perennial legumes is after the first harvest or grazing. Fertilizing then stimulates the recovery growth, which results in productive second and third cuttings or grazings.

Insects can be a serious problem on the first growth and on recovery growths of perennial legumes. Perennial grasses are relatively free of serious insect pests. First-growth alfalfa of established stands will need insecticide treatment to control the alfalfa weevil throughout the southeastern half of Illinois in 1968. Second-growth alfalfa and the other perennial legumes will often need an insecticide to control leafhopper. Severe stunting of second- and third-recovery growths is frequent when leafhoppers are not controlled. Sevin and methoxychlor are two insecticides that effectively control leafhoppers.

To obtain high yields from perennial grass and perennial legume pastures or hayfields, vigorous plants must be developed. Fall fertilization is one step toward building vigorous plants. Such plants are not as easily damaged by cold temperatures or by heaving soil conditions. The annual fertilizer application rate could be equally divided between the time after the first cutting or grazing and September. Fall fertilization coupled with late-spring fertilization makes vigorous plants that will make extra-large yields, earlier spring growth, earlier grazing, and more grazing days per acre per year.

In summary, more summer forage can be obtained from your perennial pasture and hayfields by:

1. Fertilizing the perennial grasses early in the spring and for certain ones, after the first grazing.
2. Establishing new stands of productive legumes and grasses to be grazed this summer by using herbicides to control weeds during establishment.
3. Rotational grazing of perennial legumes and grasses, except for Kentucky bluegrass.
4. Fertilizing perennials, except Kentucky bluegrass and timothy, after the first grazing.
5. Controlling insects.
6. Fertilizing all perennial forage crops in early fall.

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WEED CONTROL FOR SOYBEANS

For soybeans, Illinois farmers usually plow the seedbed and use a disk, field cultivator, or similar implement at least once to destroy weed growth and prepare a relatively uniform seedbed for planting. Planting in relatively warm soils helps soybeans begin rapid growth and compete better with weeds. Good weed control during the first 3 to 5 weeks is extremely important. If weed control is adequate during that early period, soybeans usually compete quite well with most of the weeds that begin to grow later.

Rotary hoeing is very popular for soybeans, and is used on about three-fourths of the soybean acreage in Illinois. It not only helps control early weeds, but if the soil is crusted, it aids emergence. To be most effective, the rotary hoe should be used after the weed seeds have germinated but before the majority of weeds have emerged. Operate the rotary hoe at 8 to 12 miles per hour, and weight it enough to stir the ground properly. The soil must be moved sufficiently to kill the tiny weeds.

Following one or two rotary hoeings, use the row cultivator once or twice. Adjust the row cultivator properly and operate it fast enough to move soil into the row and smother the small weeds. Avoid excessive ridging, which would make harvesting difficult.

It is often said that soybeans in narrow rows provide more shade and compete better with weeds. However, with narrow rows, there is more row area where weeds are difficult to control. Therefore, a good weed-control program is just as important, or more so, for narrow-row beans.

There is considerable interest in "solid-drilling" soybeans in 7-to 10-inch rows. However, you cannot expect present herbicides to control weeds adequately 100 percent of the time. So, for most situations, it is preferable to keep the rows wide enough to use cultivation as required. Recent research results do look encouraging, and future developments may offer a better answer for weed control in "solid-drilled" soybeans.

If you have used a preemergence herbicide and it appears doubtful that it will give adequate control, use the rotary hoe while the weeds are still small enough to be controlled. Row cultivation should be used as needed before weeds in the row become too large to be smothered.

When selecting a preemergence herbicide for soybeans consider the kind of weeds likely to be present. Many of the preemergence herbicides for soybeans are particularly effective for controlling annual grasses. The majority give good control of pigweed; many will also control lambsquarter. Most do not give good control of annual morningglory; control of velvetleaf, jimsonweed, and cocklebur is rather erratic.

Many of the preemergence herbicides for soybeans may cause occasional injury to the soybean plants. Fortunately, soybeans usually have the ability to outgrow modest amounts of early injury; usually the benefits from weed control provided by the herbicide are much greater than any adverse effects from the herbicides. There may be some exceptions, and anyone using herbicides should realize there are some risks involved.

Where you use herbicides for soybeans, it is particularly important to use high-quality seed of disease-resistant varieties. Soybeans that are under stress and do not begin vigorous growth appear to be more subject to herbicide injury. Soybeans that are injured by a herbicide are likely to be more subject to disease. Any one of these factors alone may not be too serious, but several of them acting together could be.

Soybean herbicides currently being used have not usually had any serious effect on wheat seeded after soybean harvest or on other subsequent field crops commonly grown in Illinois.

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PREEMERGENCE HERBICIDES FOR SOYBEANS

The use of preemergence herbicides for soybeans has increased rapidly, from about 5 percent of the Illinois acreage treated in 1960 to about half of the acreage treated in 1967. Whether you should use herbicides for soybeans will depend on the seriousness and nature of your weed problem, as well as your preference for various alternative methods of weed control. Preemergence herbicides are often very helpful in obtaining the necessary early control in the row. They can allow a reduction in the number of cultivations, allow faster cultivation, and reduce the amount of ridging needed to smother weeds in the row, thus making harvest easier.

Amiben has been one of the most popular herbicides for soybeans. It controls the majority of annual grass and broadleaved weeds in soybeans for most of the season. The major exception is annual morningglory. Control of velvetleaf, jimsonweed, and cocklebur is somewhat erratic. *Amiben* occasionally injures soybeans, but the damage is usually not very severe. When such damage does occur, it appears as malformed roots and stunting of the tops.

Amiben is adapted to a wide range of soil types. The manufacturer recommends 1 to 1 1/2 gallons or 20 to 30 pounds of granules (2 to 3 pounds of active ingredient) on a broadcast basis per acre--proportionately less for a band application. The higher rate is suggested primarily for heavy clay or high-organic soils. University trials have shown the best weed control with 1 1/2 gallons or 30 pounds of granules per acre. If you reduce the rate, weed control may be reduced. Consider the degree of control desired, as well as the cost. You can make a comparison of 1, 1 1/4, and 1 1/2 gallons (20, 25, and 30 pounds of granules) per acre on a field and use it as a basis for selecting rates for that field in the future. The granules and liquid perform about equally well. *Amiben* is easy to handle; it is usually applied to the soil surface at planting time.

Treflan (trifluralin) is one of the most effective herbicides available for controlling annual grasses such as foxtail. It is also the major soybean herbicide suggested for controlling wild cane and Johnsongrass seedlings. *Treflan* will control pigweed and will give fair control of lambsquarter, but it does not give good control of most other broadleaved weeds commonly found in Illinois soybean fields.

Treflan has given satisfactory control of susceptible weeds a high percentage of the time. Soybean injury is possible with *Treflan*; occasionally, fairly severe. However, compared to the advantages of *Treflan* for controlling annual grasses, the injury from *Treflan* on a statewide basis is not considered a serious problem. To reduce the possibility of injury, it is very important to follow instructions for the rate and method of application.

You can apply *Treflan* just before planting or anytime during 6 weeks before planting. Incorporate it into the soil immediately after application by using a disk or similar implement, thus reducing loss from the soil surface. Cross-disking a second time at right angles to the first diskings will produce a more uniform distribution, providing better weed control and reducing the possibility of soybean injury. You can delay the second diskings until anytime before planting, and you can use it for final seedbed preparation just before planting.

The disk probably will incorporate the chemical to only a third to half the depth of operation. Disking 4 to 6 inches deep to mix the chemical about 2 inches deep is usually considered appropriate. You can use implements other than the disk if they adequately mix the chemical to a depth of about 2 inches. Results with the field cultivator have sometimes been acceptable, but not always as good as with the disk. The degree of incorporation may vary considerably, depending on the type of implement, adjustment, speed, soil moisture, soil texture, and other soil physical conditions.

The rate of *Treflan* is between 1/2 and 1 quart (1/2 to 1 pound of active ingredient) per acre on a broadcast basis. Select the rate according to the soil type, as indicated on the label. For most of the light-colored silt loams of Illinois, 1/2 to 3/4 quart per acre is suggested; for the dark-colored silt loams, silty clay loams, and clays, 3/4 to 1 quart per acre.

Treflan is also available in granular form. The granules have not been as thoroughly tested as the liquid, but they appear to be comparable in performance.

Randox (CDAA) is primarily for the control of annual grass weeds on the relatively dark soils; it also controls pigweed. Soybeans have good tolerance to *Randox*. Since *Randox* is irritating to handle, most of it is used in granular form. Be very cautious with either the liquid or granules, to avoid irritation to skin and eyes. The suggested rate is 1 gallon of liquid or 20 pounds of granules (4 pounds of active ingredient) per acre on a broadcast basis, proportionately less for band application. *Randox* is relatively soluble, so do not use it on sandy soils. *Randox* may be expected to control weeds for about 4 weeks.

Ramrod (propachlor, formerly referred to as CP-31393) is more effective for controlling weeds than *Randox*, performs better on the lighter soils, and is less irritating. *Ramrod* can provide weed control for about 6 weeks. It is irritating, especially to certain sensitive individuals; take appropriate precautions in handling. *Ramrod* is cleared for use on soybeans to be grown and used for seed, but do not use it for soybeans that will be harvested and processed for food, feed, or edible oil purposes unless additional federal clearance is obtained. *Ramrod* is available as 20-percent granules or as a 65-percent wettable powder. On a broadcast basis, the recommended rate per acre is 20 pounds of the granules or 6 pounds of the wettable powder. Proportionately less is suggested for band applications.

Alanap Plus (NPA plus CIPC) has replaced most of the straight *Alanap* formerly used in Illinois. Although sometimes satisfactory, weed control from *Alanap* alone or combined with CIPC has been somewhat erratic. There has been occasional crop injury.

CIPC has not commonly been used in Illinois, except in combination with other herbicides. However, smartweed is particularly sensitive to CIPC; where smartweed presents a severe problem in soybeans, you might try rates of 3 to 4 pounds per acre of active ingredient on a broadcast basis--proportionately less for band application.

Lorox (linuron) has given relatively good weed control in soybeans, particularly on the light-colored silt loams. However, the margin of selectivity between dependable weed control and crop damage is rather narrow; be certain to carefully adjust rates to the soil type. The rate suggested for light-colored silt loams is 2 pounds of the 50-percent wettable powder (1 pound of active ingredient) on a broadcast basis, proportionately less on a band. Rates for other soils are given on the label. *Lorox* granules will be available in 1968 for trial use.

Vernam (vernolate) has given good control of annual grass weeds in Illinois trials, but injury to soybeans sometimes occurs. *Vernam* might be considered for the control of serious infestations of wild cane and for the control of Johnsongrass seedlings, where some soybean injury from the herbicide might be tolerated. *Vernam* can control pigweed, lambsquarter, and may give some control of annual morningglory. Since *Vernam* is relatively volatile, it usually performs best when incorporated.

Planavin is similar to *Treflan* in the kinds of weeds it will control. However, research indicates that in Illinois, higher rates of *Planavin* are needed to provide about the same control as that obtained with *Treflan*. Although results are reportedly more favorable in the cotton-growing areas of the South, the rates presently cleared for soybeans may not be sufficient for satisfactory control under some Illinois conditions. *Planavin* can be applied from 4 weeks before planting to immediately after planting. Incorporate within a few hours to a depth of 1 to 1 1/2 inches with a rotary hoe, a disk (shallow), or similar equipment.

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AGRONOMY NEWS

crops and soils

May 16, 1968

No. 370

POSTEMERGENCE HERBICIDES FOR CORN AND SOYBEANS

CORN

The major herbicide used after the crop and weeds are up is still 2,4-D. The use of 2,4-D has remained relatively constant for several years, with such treatment being applied to about 40 percent of the Illinois corn acreage.

The main point to remember about 2,4-D is that it should be applied early, when weeds are small and the easiest to kill. Don't wait until weeds are large and difficult to kill. By that time, they're already competing with the corn. An application of 2,4-D can be made almost anytime to corn. Until the corn is about 8 inches high, 2,4-D can be broadcast over the top; after that, "drop nozzles" should be used to keep the 2,4-D out of the whorl.

Each year in late July or early August, many persons want to know: "Can corn be sprayed during tasseling or silking?" Whether corn is damaged by 2,4-D at that stage is somewhat controversial. However, the main point to remember for good weed control is that the spraying should be done much earlier.

Each year, some corn is damaged by 2,4-D. Such damage is virtually impossible to eliminate. The chemical usually makes corn brittle for a week or ten days. If a strong wind comes up, some corn may be broken off; some may bend near the base (often called "elbowing").

To help avoid damage, be sure to apply 2,4-D at no more than the recommended rate. The suggested rates per acre for broadcasting are: 1/6 pound, low-volatile ester; 1/4 pound, high-volatile ester; or 1/2 pound, amine. If the application is not broadcast, apply proportionately less for the area actually treated. It is all right to direct nozzles in toward the row area, but be sure to adjust the rate so that excessive amounts are not applied to the corn.

If you use a formulation with 4 pounds of 2,4-D per gallon, each quart will contain 1 pound; each pint, 1/2 pound; and each half-pint, 1/4 pound. Thus, it would take 1 pint of amine formulation to get 1/2 pound of 2,4-D. A gallon of 2,4-D amine (with 4 pounds of 2,4-D per gallon) would be enough to broadcast 8 acres (4 lb./gal. ÷ 1/2 lb./A. = 8 acres). A gallon of 2,4-D (containing 4 pounds of 2,4-D high-volatile ester) would be enough to broadcast 16 acres (4 lb./gal. ÷ 1/4 lb./A. = 16 acres). Try to avoid cultivation during the week or ten days after applying 2,4-D—particularly if the corn appears brittle and is so tall that it might be broken by the cultivator.

Being much less volatile than 2,4-D ester, an amine formulation of 2,4-D will help reduce the possibility of injury to nearby, sensitive plants. However, fine-spray particles of either amine or ester can drift with wind, so try to spray when there is little or no wind. Using relatively low pressures (20 to 30 p.s.i.) and adequate water helps to reduce drift. A common coverage is 5 to 10 gallons of spray per acre.

During the past few years, there has been some use of *oil-soluble amine* formulations of 2,4-D. Esters are usually formulated in oil; most amines are not. Being formulated in oil, the oil-soluble amines are said to be about equal to esters in effectiveness, with the safety features of other amines. The basic ingredient is still 2,4-D; as long as the appropriate rate is used, weed control has generally been comparable with that of other 2,4-D formulations.

Banvel-D (dicamba) has federal clearance for use as a postemergence treatment for corn. Intended primarily for the control of broad-leaved weeds, it is similar to 2,4-D in some respects. Corn has relatively good tolerance to Banvel-D—at the recommended, postemergence rates. Banvel-D controls smartweed better than 2,4-D. Atrazine is also quite good for this purpose.

Although Banvel-D has had only limited use in Illinois, there have been a number of cases of injury to soybeans near cornfields where this herbicide was used. Unless some solution can be found to reduce the risk of injury to soybeans, this herbicide will probably not be widely used in Illinois.

Atrazine can be used as an early, postemergence application (until weeds are 1-1/2 inches high, but within 3 weeks after planting). A regular preemergence application at planting or shortly after (or possibly a preplant application) is generally preferred. But if the application is delayed for some reason, the post-emergence treatment is often satisfactory. If atrazine is used after weeds have emerged, the addition of 1 gallon of oil formulation especially for this purpose has generally increased the effectiveness. On the relatively light-colored soils of Illinois, a regular preemergence application of Atrazine will likely remain

one of the most successful treatments. On the relatively dark soils of the state, there is increased interest in the "Atrazine-oil" treatment. Research and field experience suggest that for those relatively dark soils, 2-1/2 pounds of Atrazine 80W plus 1 gallon of oil may be just as effective initially, sometimes more effective, than a preemergence application of 3-3/4 pounds of Atrazine 80W.

As with many herbicide applications, the results with Atrazine and oil will be influenced by many factors, and results are not always consistent. Early application is important, when grasses are small--especially for control of annual grasses. If the rate of Atrazine is reduced below the rate normally recommended for preemergence application, the length of control during the season may be reduced. However, a reduced rate applied early in the postemergence period may reduce the possibility of residual activity on other crops the next season.

Where a reduced rate of Atrazine has been used in combination with another herbicide for preplant or pre-emergence application, an early postemergence application of Atrazine at a reduced rate with oil might offer another chance, in case control with the earlier treatment has not been satisfactory. However, where Atrazine is applied twice, do not let the total rate used exceed the amount normally recommended for preemergence application for the particular soil. On the darker soils, the early postemergence application with Atrazine and oil may be of particular help where rainfall is less certain, and where soil conditions are too wet for cultivation.

Although corn has displayed excellent tolerance to Atrazine alone, corn has sometimes shown a general stunting where oil was added. In 1967, there were a few cases of fairly severe injury to corn where Atrazine and oil were used. Weather conditions, stage of growth, rate of growth, genetic differences, and rate of herbicide used with oil seem to be some of the factors involved.

SOYBEANS

Tenoran (chloroxuron) can be applied when broad-leaved weeds are less than 1 to 2 inches high and grass weeds no more than 1/2 inch high. Under favorable conditions, *Tenoran* may give fairly good control of many broad-leaved weeds. Velvetleaf is more difficult to control; it should be not over 1 inch when treated. Although intended primarily for control of broad-leaved weeds, *Tenoran* may give some control of grass if you apply it under favorable conditions when grass weeds are very small.

The major interest in *Tenoran* would be as a possible control for some of the broad-leaved weeds, where a pre-emergence herbicide such as *Treflan* had been used. Control with *Tenoran* has been somewhat erratic, and soybeans are usually injured at the rates required for weed control. However, *Tenoran* injury to soybeans may not necessarily be reflected in final yields.

2,4-DB is sold under several trade names, including *Butoxone SB* and *Butyrac 175*. It can be applied from 10 days before soybeans begin to bloom until midbloom. Consider this herbicide for emergency situations where cocklebur is quite serious (as in some bottomland areas). The chemical may also give fairly good control of annual morningglory and giant ragweed. But do not expect good control of most other weeds found in Illinois soybean fields. Soybeans may show early wilting, followed by a later curving of the stems. Some cracking of stems and some proliferated growth may occur at the base of the plants. Lodging may be increased. If excessive rates are applied or unfavorable conditions exist near time of treatment, yields may be lowered. Carefully follow application rates specified on the label.

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AGRONOMY NEWS

crops and soils

May 20, 1968

HARVEST ALFALFA EARLY AND FERTILIZE

No. 371

Harvest alfalfa before flowering for highly digestible, nutritious feed. Digestibility, protein content, digestible energy, mineral and vitamin contents are all greater in early-cut versus late-cut alfalfa. This early harvest enables the regrowth period to start when soils are still moist from spring rains. Early harvesting reduces some of the insect damage--particularly late stages of the alfalfa weevil. Also, harvest early to reduce leaf losses due to foliar diseases, shading, and old age.

How early can we afford to cut alfalfa? For animal feed, the earlier the harvest the higher the feed value. For crop yield, a much later harvest produces the greatest tonnage. The hay yield of the first cutting is usually greater if the first harvest is made when the plant is in full flower, rather than in the late-bud to first-flower stage. Allowing alfalfa to develop to full flower will result in a lower *total* yield for the year, because of being able to make only 2 or 3 cuttings as compared to 3 or 4 cuttings if early harvesting is practiced.

Determining how early to cut alfalfa requires a compromise between feed value and total feed production. When measured as animal products per acre (milk or meat), the best time to harvest is when alfalfa is in the late-bud to first-flower stage. The digestibility and other nutritive qualities are high then, and the ability of the plant to recover rapidly after cutting is also high.

Harvests made before buds appear are likely to reduce the vigor of the crop for the remainder of the season, and may result in thinning the stand. The root reserve level is not fully recharged with sugars and starches until the blooming period. However, the alfalfa plant does not require a fully recharged root to "kick off" new growth. Harvests made before flower buds or new crown shoots appear may catch the roots at a low "charge" level.

Recovery growth is slow if the roots have a low level of sugars and starches. Diseases and weeds can invade a low-vigor crop more easily than a vigorously growing crop. Insect damage, particularly leafhoppers, will appear to be more devastating because the plant isn't making a rapid enough growth to outgrow the insect damage.

The approximate dates when alfalfa will be in late bud to first bloom are May 10 to 15 in extreme southern Illinois, May 15 to 20 in the southern half, May 20 to 25 in the central portion, and May 25 to 30 in northern areas of Illinois. Slight variations from these dates will be noticed due to unusual temperature conditions and varieties. Many of the newer varieties flower earlier than older ones. Early varieties will be ready for harvesting on the earliest of the suggested dates, or even earlier.

Harvesting alfalfa any earlier than the suggested dates above should be based on plant development. If flower buds are well developed or if new crown shoots are present, the crop is ready for harvesting.

To "kick" that regrowth into "high gear" for top yields, be sure your fertility isn't limiting. If you don't know the level of phosphorous, potassium, and lime in your soil, a soil test can help you evaluate it. A highly fertile soil may show no response to phosphorous and potassium fertilization during the first production year. Soils that are low or medium in fertility will need top-dressing after the first and third harvest each year. Alfalfa is a heavy feeder on potassium; so unless this nutrient is applied, the following growth may be deficient and grow poorly. The amount of nutrients to apply should be determined from soil-test information. In the absence of a soil test, a general suggestion is 250 to 400 pounds per acre of an 0-10-30 or 0-10-40 or equivalent, after the first and third harvest. If the stand is not to be held over for the next year, the application after the third harvest need not be made.

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crops and soils

May 27, 1968

No. 372

TOPICS: HEAT UNITS AND 1968 AGRONOMY FIELD DAYS

HEAT UNITS

"Heat Units." How many times did you hear these words last fall? Crop growth and maturity are greatly influenced by the amount of "heat" received during the growing season.

Temperature is one of the more important environmental factors that determines how rapidly corn grows and develops. For example, corn grows very little when the temperature drops to as low as 50° F. Research and experience have demonstrated that temperature-growth rate information may be useful for predicting when corn will reach certain stages. Several seed corn producers use this information to help predict such things as when detasseling crews will be needed. They do this by keeping a record of the "heat units" accumulated.

Calculating heat units is simple. The number of heat units for a particular day is determined by (1) adding the lowest and highest temperature for the 24-hour period, (2) dividing by 2 to get the average temperature, and (3) subtracting 50. For example, a day with a low temperature of 60° and a high of 86° would accumulate 23 heat units $\left(\frac{60 + 86}{2} - 50 = 23\right)$. Since corn doesn't grow at temperatures below 50°, disregard temperatures lower than that and use 50° as the low figure when determining the average temperature for the day.

In central Illinois, 20 to 22 heat units are roughly equal to one day in the life of a corn plant. Moisture must be adequate. Without moisture, all bets are off! Extended periods of high temperatures (over 90°) also need to be discounted, because they usually occur when it is dry and the plant is under stress for moisture.

Normally, corn varieties adapted to central Illinois require 66 to 68 days, or 1,400 to 1,500 heat units, to reach the pollen-shedding stage. Short-season varieties will reach this stage in fewer days; full-season varieties require more. If moisture is short, development may also be delayed.

The period from pollination to physiological maturity (30-percent kernel moisture) is also influenced by temperature. The average variety adapted to central Illinois requires another 55 to 60 days, or another 1,200 to 1,300 heat units, from pollination to physiological maturity. Late-maturing varieties require a little longer than short-season ones, but the difference between varieties of different maturities is much less for this period of growth than for the period between emergence to pollen-shedding.

Keeping heat unit records this summer may be an interesting and an informative activity. It may help you predict when your crop will be ready to harvest. Keep in mind, however, that in this *AGRONOMY NEWS*, we are talking in terms of averages, not specific varieties.

The progress and development of a specific variety can be predicted only after 2 or 3 years experience. (*Prepared by W.O. Scott*).

1968 *AGRONOMY FIELD DAYS*

Field days, featuring research programs in Agronomy, will be conducted at research centers throughout Illinois this summer. Early- and late-summer field days are planned for Brownstown and Carlinville. Representatives from the University of Illinois will be present to discuss research programs on these fields.

DATE	TIME	FIELD	DATE	TIME	FIELD
June 13	9:00 a.m.	Brownstown ^{1/}	Sept. 4	9:00 a.m.	Brownstown ^{1/}
June 20	1:00 p.m.	Belleville ^{2/}	Sept. 4	6:00 p.m.	Carthage
June 26	10:00 a.m.	DeKalb ^{1/}	Sept. 5	1:00 p.m.	Carlinville
June 27	6:30 p.m.	Carlinville	Sept. 5	1:00 p.m.	Toledo
July 25	1:00 p.m.	Carbondale ^{3/}	Sept. 6	1:00 p.m.	Oblong
Aug. 16	10:00 a.m.	Dixon Springs ^{1/}	Sept. 9	1:00 p.m.	Newton
Aug. 19	4:30 p.m.	Kewanee ^{1/}	Sept. 12	8:00 a.m.	Urbana
Aug. 26	6:00 p.m.	Aledo	Sept. 16	1:00 p.m.	Dixon
Aug. 27	4:30 p.m.	Hartsburg ^{1/}	Sept. 17	1:00 p.m.	Elwood

^{1/} Food will be available.

^{2/} Sponsored by Southern Illinois University. The field is at the Southwestern Farm Research Center, opposite the south gate of Scott Air Force Base.

^{3/} Sponsored jointly by Southern Illinois University and the University of Illinois. All other meetings are sponsored by the University of Illinois except as noted.

(*Prepared by D.W. Graffis and L.F. Welch.*)

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AGRONOMY NEWS

crops and soils

June 25, 1968

No. 373

CONTROL FENCEROW WEEDS EASILY

If you're looking for an easy way to control weeds in your fencerows, try spraying. Farmers who have tried it are enthusiastic about the results. It will keep fencerow weeds from spreading to your fields, and it will keep your fencerows looking neat. Spraying surely beats struggling with a mower on a hot July day. It will also do a better job of keeping down regrowth and production of weed seeds. The smaller the weeds, the easier they are to kill. June is usually the best time. If some regrowth occurs, you may want to spray again later in the summer.

Here's a good spray program:

Put 50 gallons of water in your spray tank.

Add 5 pounds of Dowpon just as it comes from the container.

Add 1 pound of 2,4-D. That's the same as 1 quart if you're using 2,4-D with 4 pounds of active ingredient per gallon.

This will give you enough spray to cover an acre of fencerow. That's about the same as 2 miles of fencerow 4 feet wide, or one time around 160 acres.

If there are any susceptible crops or plants in the vicinity, it would be safer to use the amine rather than the ester form of 2,4-D. Use a nozzle that will apply a fairly coarse spray. Some farmers use a regular garden hose nozzle. To help prevent drift, spray during a day when there is little or no wind. Dowpon and the amine form of 2,4-D don't volatilize like 2,4-D ester, so there isn't so much danger to nearby plants unless the spray is too fine and the particles drift to susceptible plants.

Dowpon controls grasses, and the 2,4-D controls broad-leaved weeds. You can adjust the amounts of material given above to fit your specific situation. If the grasses are mostly annuals (like foxtail) and they are only 2 or 3 inches high, then 2 or 3 pounds of Dowpon should be enough. Lowering the rate should also reduce damage to desirable perennial grasses (bluegrass, brome grass, and others). If you have perennial grasses like Johnson grass in the fencerow, you may want to increase the amount of Dowpon to about 10 pounds per acre.

If broad-leaved weeds are your main problem, you could use 2,4-D alone without Dowpon. One pound of 2,4-D per acre should kill most broad-leaved weeds without killing desirable grasses. If you have Canada thistles in your fencerow that 2,4-D won't control, you can spot-treat them with amitrole or amitrole-T.

Remember, the smaller the weeds, the easier they are to kill.

Don't let your livestock graze fencerows treated with Dowpon, amitrole, or amitrole-T. Although 2,4-D is not highly toxic, it apparently makes some poisonous plants more palatable, so take precautions. Check product labels for more specific information on the use of these herbicides.

Soil sterilants, such as chlorate mixtures or high rates of atrazine or simazine, are sometimes used in fencerows to kill the vegetation for a longer time. But permanent sterilization may leave the ground bare and subject to erosion. It also tends to destroy wildlife cover. Most farmers prefer temporary treatment that will allow desirable vegetation to grow again in the fencerow.

In warm, moist weather, Dowpon and 2,4-D usually decompose well enough in 4 to 6 weeks to allow newly seeded grasses to grow. This fall, you may want to seed a desirable grass, such as brome grass, in the fencerow. A good competitive grass stand will help keep out undesirable annual grasses and broad-leaved weeds.

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No. 374

SEEDING ALFALFA AND OTHER FORAGE CROPS IN LATE SUMMER

Alfalfa, red clover, and the perennial grasses (commonly used in pastures and hay fields in Illinois) can be seeded in August or early September throughout the state. Seedings should be made by mid-August in the northern quarter of Illinois; these can be made as late as mid-September in the southern quarter of the state. When moisture is in good supply at seeding time and after seeding, there is little chance of stand failure or winter injury. However, if a drought period continues through August and September, seedings made during such a period may be late in emerging, small in size, and may fail to survive the winter.

Varieties that have vigorous seedlings should be chosen for late-summer seedings. The Flemish alfalfas, for example, have more vigorous seedlings than Vernal. Inferior stands of Vernal, as compared to Flemish varieties, have occurred frequently when August seedings were made during drought-like periods. When seedbeds are well supplied with moisture, Vernal can be successfully established, if the seeding is made early in the desired seeding period. If the seeding is made late in the desired seeding period, a variety with vigorous seedlings should be chosen.

Late-summer seedings do not need a companion crop because weeds seldom are a problem. No clipping or harvesting should be done to late summer seedings. Weeds that could become a problem are usually killed back by frost. The crop growth that accumulates by late fall is needed for insulation and to trap snow. This growth should not be removed from new seedings.

Check the fertility status of the soil before the seedbed is prepared. Apply lime if needed to bring the pH to above 6.5, preferably to 6.8 or 7. Phosphorous and potassium test levels should be in the high range. Phosphorous can be supplied at this time to carry the expected crop for 4 years. However, do not apply potassium for more than two years.

Work the fertilizer into the seedbed and firm with a corrugated roller. Use a starter fertilizer. On soils with a low organic-matter content, 200 to 300 pounds per acre of a 5-20-20 or a 6-24-12 fertilizer (or the equivalent) is suggested. On medium to high organic-matter soils, 200 to 300 pounds per acre of a 0-20-20 or a 0-20-10 fertilizer (or the equivalent) is suggested.

A grain drill equipped with band seeding tubes and press wheels for each seeded row is an excellent tool for late-summer seedings. A corrugated roller seeder is also a good tool. With the grain drill, the starter fertilizer can be placed

about an inch in the soil; the seed, on the soil surface directly above the fertilizer band. The press wheel should then be rolled directly over the seed, using the wheel to press the seed into the soil. Alfalfa seed and most of the small, seeded forage crops emerge best if they are seeded a quarter- to a half-inch deep--the approximate depth produced by using press wheels or corrugated rollers. Some seed will be near the soil surface, but the majority of the seed will be covered to about the desired depth.

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No. 375

FALL HARVEST OF ALFALFA

The last, safe harvest date for alfalfa, red clover, birdsfoot trefoil, and crownvetch is September 1 in northern Illinois, September 10 in central Illinois, and September 15 in southern Illinois. These dates were established after many years of study and are safe dates.

There are years when the weather remains warm and when alfalfa will grow later into the fall, thus allowing later cuttings. Too often, the weather changes and growth adequate to restore sugars and starches into the plant roots does not occur after a late harvest. Sugars and starches are used by the legumes plant as a source of energy throughout the winter and for spring growth. The plant needs to have about 6 or 8 inches of top growth before it stops using reserve sugars and starts storing. Hence, a high reserve level of sugars and starches is needed in the spring with which to "kick off" early, vigorous growth. Alfalfa that is harvested or grazed during the September-October period (when root reserves are being stored) may die to winter killing, may suffer severe heaving damage, or may be slow to grow in the spring.

These problems have been occurring on Illinois farms, in spite of the same practice not causing any noticeable problem during several previous years. If 8, 9, and 10 tons of hay per acre is the goal, good fall management is needed.

A late-fall harvest of alfalfa or red clover is possible in central and southern Illinois. "Late fall" means after October 25 in central Illinois and after November 1 in southern Illinois. Little regrowth that would "sap" the reserve sugars and starches from the alfalfa or red clover roots is likely after these dates. This late harvest is not suggested for crownvetch or birdsfoot trefoil or for alfalfa or red clover seeded this past spring or late summer. Forage harvested in the late fall is a "bonus" crop, and should be taken only when the extra forage is needed. Leaving the alfalfa or red clover field without a crop-residue cover does increase the risk of winter injury. If straw or strawy manure is available, this should be spread on late-harvested fields to provide some protection. Even if crop residues or manure are not available, the risk of winter injury is low enough to justify harvesting the crop in late October or early November, if the forage is needed.

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August 14, 1968

FALL FIELD DAYS ARE ALMOST HERE!

Fall field days begin at Dixon Springs on August 16 and end at Elwood on September 17. In between, there will be eleven other meetings scattered over Illinois. Plan to attend. Check the fields nearest you and mark your calendar now.

SOUTHERN AND SOUTH-CENTRAL ILLINOIS

Dixon Springs Research Center: Pope County, August 16, 10 a.m. (Lunch will be available.) George McKibben, Lee Gard, and the other staff members there are planning a big day. Minimum tillage will be one of the highlights. Forage production, wheat culture, double-cropping, and soil fertility research are just some of the other topics to be discussed.

Brownstown Research Center: Fayette County, September 4, 9 a.m. (Lunch will be available.) Pat Johnson always has a "bang-up" program for this one. Bob Lahne and other Extension advisers from surrounding counties will be on hand to discuss research and answer questions. Fertilizer rates for corn and soybeans, herbicides, minimum tillage, corn and soybean varieties, and 100-bushel wheat are some of the topics for demonstration or discussion.

Carlinville Experiment Field: Macoupin County, September 5, 1 p.m. Les Boone says the crops are looking good. The emphasis will be on corn and soybeans, but you will also want to hear about the good wheat yields of this spring. Features will include corn and soybean fertility, soybean varieties, plant diseases, insect situation and control, zero tillage, and plant analysis. Don't miss this one.

Toledo Experiment Field: Cumberland County, September 5, 1 p.m. Pat Johnson and Keith Romack will be expecting you. Rates of 0, 60, 120, 180, and 240 pounds of N per acre have been applied to corn for four years in a corn-soybean cropping system. You can learn about the effect of the nitrogen rate on corn yields and on the beans that follow. Phosphorus and potassium rates on corn and beans will interest you, too. Come hear the latest on corn and soybean varieties.

Oblong Experiment Field: Crawford County, September 6, 1 p.m. Pat Johnson, Boyd Lahr, Les Boone, and Dale Millis will team up to show you what's going on. Rates of nitrogen, phosphorus, and potassium on corn and soybeans will be featured. You'll also hear what's new in herbicides, soybean and wheat varieties, etc.

Newton Experiment Field: Jasper County, September 9, 1 p.m. Pat Johnson will be joined by Larry Casey, Les Boone, and Bill Oswald. Come hear the latest on herbicides, fertilizer rates, varieties, and "slick spots." See the soil-probe truck and become acquainted with soils of the area.

CENTRAL ILLINOIS

Hartsburg Experiment Field: Logan County, August 27, 3 p.m. John Dillon and Charlie Engelhardt will team with other specialists for this one. Attractions will include fertilizer rates on corn and soybeans, corn planting dates, corn and soybean varieties, tissue testing, insect control, double cropping, and many others.

Urbana, Agronomy South Farm: Champaign County, September 12, 8 a.m. Gene Oldham will keep you informed about this one. The Morrow Plots will be dedicated as a National Historical Landmark during the afternoon.

NORTHERN ILLINOIS

Dixon Experiment Field: Lee County, September 16, 1 p.m. Derreld Mulvaney and Jim Somers will be joined by other specialists as your hosts. Time and rate of fertilizer application on corn and soybeans, forage crops, insect situation and control, and soils of the area are just a few of the items on the program for that day. This is a good one to attend.

Elwood Research Center: Will County, September 17, 1 p.m. Derreld Mulvaney and Andy Wicklein have a lot of research to show you. They will be joined by other specialists, who will discuss soils of the area, fertilizer rates, row width, varieties, insects, and other topics you won't want to miss. This is your last chance to attend a field day in 1968.

WESTERN ILLINOIS

Kewanee Experiment Field: Henry County, August 19, 2 p.m. Grant Bretzlaff and Darl Fike always have a good one here. Featured will be April-planted corn and soybeans, crambe, minor elements, mini-milo, edible soybeans, a soil-coring machine, soybean varieties, narrow rows, "pop-up" fertilizer, corn population, and many others that you shouldn't miss. Free food will be served.

Aledo Experiment Field: Mercer County, August 26, 6 p.m. Join Grant Bretzlaff and J.E. Coplan to see what's happening at this field. See and hear specialists discuss crambe, high-lysine corn, soybean varieties, corn populations, soybean growth regulator, fertilizer rates for corn and soybeans, corn rootworm control, and herbicides. Don't miss this one.

Carthage Experiment Field: Hancock County, September 4, 6 p.m. Grant Bretzlaff and Ray Rendleman made this one convenient for you. You can do a day's work, then come and see the many interesting things here. The soil-coring machine will help you take a look at soils of the area. Fertilizer rates for corn and soybeans, insect control, herbicides, and crop varieties are just a few of the things the specialists will discuss.

L.F. Welch and Don W. Graff's
Extension Agronomists

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September 1, 1968

No. 377

1968 WINTER WHEAT VARIETY TRIALS

Wheat yields on Illinois farms in 1968 were a little disappointing. Much of this was a result of late planting last fall, disease infections in the fall and spring, winter kill or excessive heaving, and excess moisture this spring. Many of these factors are beyond the farmer's control. But, selecting a high-yielding variety is one of the most-important and easiest steps toward higher yields. Disease and insect resistance are also important considerations. Resistance to these environmental hazards helps the variety perform consistently year after year. Varieties that lack resistance to one or more of the major hazards may perform well in some years and poorly in others.

New varieties are being developed continually. Arthur--a soft, red winter variety--and Parker--a hard, red winter variety--are two recent ones. Seeds of these varieties are being multiplied and will be widely available in another year or two. Hybrid wheat research progress indicates the possibility of other varieties in 3 or 4 years.

Yield Record of Leading Varieties in Agronomy Department Tests^{a/}

	Brownstown		Urbana		DeKalb	
	1968	1966-68	1968	1966-68	1968	1966-68
	(bu./A.)	(bu./A.)	(bu./A.)	(bu./A.)	(bu./A.)	(bu./A.)
Soft Red Winter						
Benhur	45	61.3	55.6	58.8	47.8	38.6
Monon	47	62.6	57.5	54.4	55.6	40.8
Stadler	47	57.9	62.9	54.6	54.0	45.3
Riley 67	46	60.3	57.4	53.4	54.3	43.7
Vermillion	47	54.9	60.5	51.4	53.7	43.9
Knox 62	47	56.6	53.4	53.4	47.0	39.0
Arthur	48	...	60.9	...	51.7	...
Hard Red Winter						
Gage	46	55.3	50.3	50.7	43.5	42.5
Ottawa	37	49.0	41.5	44.1	46.1	41.3
Pawnee	44	50.6	42.2	43.4	48.1	42.0
Triumph	48	54.3	36.0	41.0	31.8	34.9
Scout	45	53.3	46.3	53.0	48.0	41.6
Scout 66	44	...	49.3	...	42.2	...
Guide	44	...	43.8	...	44.0	...
Parker	47	...	54.8	...	51.4	...

^{a/} Data provided by C.M. Brown and J.E. Dillon, UI Agronomy Department.

AGRONOMY DAY--URBANA

SEPTEMBER 12, 1968

Don W. Graffis
Extension Agronomist

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No. 378

AGRONOMY DAY SEPTEMBER 12

Agronomy South Farm
Urbana, Illinois

SQUANTO SAYS
COME SEE...

- Heap Big Corn
- Heap Big Beans
- Dedication of
the Morrow Plots

Things to see and hear about at Agronomy Day:

- Modified-protein corn
- Exotic corn
- Stalk rot in corn
- Wheat culture
- Effect of fertility on corn moisture
- Zero tillage
- Soybean varieties
- Herbicides for corn
- Herbicides for soybeans
- Soybean diseases
- Tissue testing
- Corn fertility
- Corn plant types
- Light, air, and water use by soybeans

The Morrow Plots, a crop and soil experiment field, were established in 1876 and now constitute the oldest experiment field in America. Once south of the University campus, the Morrow Plots are now surrounded by it. The Morrow Plots were designated as an Historic Landmark by the Department of Interior this year. The dedication ceremony will take place on September 12, as a part of Agronomy Day.

We will be looking for you on September 12.

Don W. Graffis
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September 9, 1968

No. 379

DESSICANTS FOR DRYING WEEDS IN SOYBEANS?

Forget them! About half a dozen chemicals would give some drying of weeds in soybeans, but none have federal clearance for soybeans to be raised for food or feed.

Nitrogen solutions have been considered, but according to the USDA, nitrogen solutions would need specific clearance for this purpose. We are not aware of any current federal clearance for use of nitrogen solution as a dessicant in soybeans.

There might be a possibility of using some dessicants in soybeans raised for seed, but growers of certified seed usually have clean fields. If you have a field with a weedy mess and poor quality beans, you probably wouldn't want to save those beans for seed.

We realize that those green weeds are rough on a combine, but the weeds have already competed and a dessicant isn't going to make the weeds or the weed seeds disappear. At best, the drier weeds would be easier to run through the combine.

According to Iowa Special Report 53, "How a Soybean Plant Develops," dry matter accumulates in the beans at a rate of 60 to 90 pounds per acre per day during pod development until the beans are mature. So application of a dessicant before the beans reach maturity would likely reduce yields.

This is borne out by a University of Illinois study:

Date chemical applied	Stage of maturity	Treated plot bu./A.	Check plot bu./A.
August 28	1% leaves yellow	24	35
September 2	8% leaves yellow	28	35
September 6	75% leaves yellow	30	35
September 10	50% leaf drop	35	35
September 14	Mature	35	35

Applying chemicals for drying weeds after the crop is mature would necessitate an extra field operation and possible delay in harvest, which could mean increased field losses of beans. Even if the chemical dried up some of the weeds, much of the weed plant would still remain to cause trouble. Chemicals may help to dry but do not get rid of large stiff stems of weeds like velvetleaf and pigweed. Dessicants may remove some of the moisture from grasses like foxtail, but

the wiry stems will still remain. Equipment used to apply the chemical after the beans are mature may cause some beans to shatter. It is doubtful that the benefits from applying dessicants for drying weeds in soybeans would be sufficient to compensate for the expense of using them.

The best way to avoid trouble with weeds at combining time is to use good cultural and chemical control methods early in the season. If you can control the early weeds, soybeans will usually compete well with the late-season weeds. Use a rotary hoe. Do a good job of cultivating the rows. Consider preemergence herbicides.

Elley L. Knake
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September 30, 1968

No. 380

NEW DEFINITION OF HYBRID SEED

The Federal Seed Act was amended July 31, 1968, to change the amount of hybridization necessary to legally label seeds as "hybrid." Seeds that are 95-percent hybrid are required to be labeled "hybrid." Seeds that are 75- to 95-percent hybrid are required to be labeled "hybrid," but must show the percentage of pure seed that is hybrid seed or carry a label stating "contains from 75- to 95-percent hybrid."

Copies of the amendments may be obtained from the Seed Branch, Grain Division, Consumer and Marketing Service, Agricultural Research Center, Beltsville, Maryland 20705. The Federal Seed Act is a truth-in-labeling law designed to protect farmers and consumers in the purchase of seed.

"Hybrid seed" does not necessarily mean that the plant produced will be superior to its parents. Resistance to diseases, insects, and lodging as well as factors of yield and seed quality should be considered when purchasing a new crop variety or hybrid. The change in the Federal Seed Act may enable the marketing of some seed as "hybrid" that has not previously been eligible to be so labeled. Hybrid wheat, hybrid barley, and hybrid alfalfa are nearing commercial production. Hybrids in these crops may be exceptional in yield and they may not. The range of adaptation of new hybrids and their reaction to diseases, insects, varying fertility, and soil factors are items of information needed to judge their potential. As these new breeding programs gain experience, hybridization in field crops other than corn and sorghum is likely to prove as valuable as previous hybrid developments.

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CHICAGO, ILLINOIS

OCT 29 1968

October 8, 1968

WHEN TO PLOW--FALL OR SPRING

No. 381

Favorable weather after the harvest of the 1968 corn and soybean crops will encourage many Illinois producers to consider fall-plowing as many acres as possible before the winter "freeze-up."

Deciding whether to plow this fall or wait until spring is a *management decision*, involving consideration of the number of acres you have to plow, your labor supply, your production goals, and your soils. The weather is also a factor.

With only a few acres to plow, the time of plowing may not be critical. However, on larger farms with more acres of corn and soybeans, there is often a "squeeze" on the available labor supply. This squeeze may be especially critical if field work is delayed by a cool, wet spring. Shredding stalks, applying fertilizer, and plowing in the fall can help shift part of the labor load away from the busy planting season.

If your sights are set on high corn yields, early planting is probably an important part of your production program. Fall-plowed fields usually dry faster and warm quicker than fields plowed in the spring. Hence, fall-plowing may allow you to plant earlier. This indirect yield effect is especially important on soils with poor natural drainage. Such soils are most likely to dry and warm slowly in the spring.

If worked when they are too wet, dark-colored, moderately fine and fine-textured, poorly drained soils develop poor structure. Drummer silty clay loam is an example. Soils like Drummer turn over in slick slabs if plowed when wet. After plowing in the fall, alternate freezing and thawing help break the slabs apart, resulting in a more-favorable soil structure. The soil can be worked earlier the following spring. Fewer tillage operations--with correspondingly lower production costs--are needed to prepare a satisfactory seedbed on a fall-plowed field that has benefited from Mother Nature's "granulator."

Light-colored, silt-loam soils are less likely to benefit from fall-plowing. Alternate freezing and thawing may cause these soils to "crust" or run together during the winter. A crust may also form on dark-colored soils if beating rain or wind movement of soil particles seals the soil surface. The crusting will cause slower drying and warming of the soil.

Fall-plowed fields are without vegetative cover for more than half the year. If rainfall or snow-melt occurs faster than the soil can absorb the water, runoff will occur. On bare, unprotected soils, water erosion may be severe. The effect of erosion is more serious on some soils than on others.

Erosion is a serious problem on soils with subsoil and substratum horizons that are unfavorable for root development. The loss of a few inches of surface soil may cause damage that cannot be repaired. Clarence and Swygert are examples of soils with clay or silty clay horizons that are unfavorable for root development.

If these soils are on slopes of 2 percent or more, serious erosion may result from fall-plowing. Also, water moves slowly through these soils; thus, wet soil conditions may often delay spring operations and planting. The choice is (1) to plow in the fall and risk a permanent loss of productivity or (2) to plow in the spring and risk a delay in planting.

Erosion is less serious on soils such as Tama silt loam that have subsoil and substratum horizons favorable for root development. On slopes of 2 to 5 percent, soils like Tama can be fall-plowed on the contour without suffering permanent damage--especially if you leave a rough, trashy surface. On steeper slopes, fall-plowing is risky, even on soils with favorable lower horizons.

Wind erosion may be a problem if there is a dry winter or spring. If you delay plowing sandy soils and soybean stubble until spring, you may prevent excessive soil blowing on these loose soils. Leaving a rough surface on fall-plowed cornfields will help reduce soil movement. Light seedings of spring oats in the fall are also helpful--if you can plow and make the seeding early enough for the oats to germinate. Unplowed strips--15 feet wide every 100 to 120 feet--also provide a barrier to soil movement, as long as they are nearly perpendicular to the prevailing wind.

The decision to plow this fall or to wait until spring is yours to make. You are likely to be more satisfied with the results of your decision if you carefully size up your own situation--in terms of your soil(s), your crop-production plans, and the potential gains and losses involved in plowing this fall or next spring.

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crops and soils

October 15, 1968

No. 382

STORE HERBICIDES AND PESTICIDES SAFELY

With the close of harvest season and the approach of winter, it's time to check your pesticides to see that they are properly stored. Be sure to store them in a safe place so that children, pets, farm animals, and irresponsible people can't get to them. Then lock the storage place. If you don't have a separate storage room, you might consider building a low-cost wire cage.

Don't store herbicides close to food, feed, fertilizer, or other chemicals, such as insecticides. Some pesticides are volatile, and contamination might occur. Also check for open or broken bags and containers. Seal in original containers or discard. Tighten caps on bottles and cans.

Store pesticides only in the original containers. If the label is gone, dispose of the pesticide. If the label is not completely legible but you can tell what it is, ask your dealer for a new label. **DON'T STORE ANY PESTICIDE IN SOFT DRINK BOTTLES, HONEY JARS, OR OTHER CONTAINERS THAT CHILDREN MIGHT RECOGNIZE AS FOOD OR DRINK CONTAINERS.**

Store liquid herbicides, such as some of the 2,4-D concentrates and Treflan, at temperatures above freezing. If the basement is the only warm area, use some judgment about what materials to store there and how to store them. Although some herbicides are relatively nontoxic and are not very volatile, others could be a real problem, if a container should leak or break. Just a little 2,4-D escaping from a container in the basement might find its way to the living area of the house and damage house plants. And a broken jug of Radox in the basement would be mighty unpleasant company.

Freezing not only may break some containers, but also can cause some herbicides to crystallize or "salt out." Sometimes the frozen material will go back into solution after adequate warming and agitation, but it's best not to let them freeze in the first place. The use of held-over herbicides that have been frozen and later thawed may in some cases explain the lack of weed control. Most dealers know the effects of freezing and thawing, and they provide adequate storage facilities to prevent freezing. They also know what storage precautions to take with each specific material.

Store wettable powders and granular herbicides in a cool, dry place. The area doesn't need to be heated. But be sure that the containers are sealed and that the material doesn't get damp or wet. Also, don't store herbicides on oily floors.

When ordering your pesticides for next year, try to figure your needs closely enough to avoid having a lot of carry-over to store.

Now is also a good time to make a safety check of your spray equipment and order needed new parts.

Don't forget to drain and clean your spray equipment. Check the screens and clean or replace them as needed. Be sure to drain water from the pump and any other parts that could be damaged when water freezes. Lubricate when necessary. Check hoses and clamps. Replacing old ones can help you get the pesticide where it belongs instead of on yourself. Replace brass nozzle tips on herbicide sprayers after each one has been used for spraying 100 acres. Studies show that not only does the hole in the nozzle tip increase in size with use and wear, but the uniformity of the spray pattern can change, causing uneven application. Uneven spraying might affect weed control and could also increase the chances that certain herbicides might damage the crop. Nozzle tips cost so little that you will probably not have anyone giving you a high-pressure sales pitch to buy them. But you'll be doing yourself a favor to replace them.

Finally, check your supply of goggles, rubber gloves, and other protective clothing for handling pesticides. Order early so that you'll be ready to go in the spring.

(Originally issued as No. 355 on
October 9, 1967)

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crops and soils

December 31, 1968

No. 383

HAPPY NEW YEAR
From Your Agronomy Extension Staff

We hope to see you at one of the Agronomy Day Meetings this winter. Regional Crop Production Days and Regional Crop Protection Days will be our feature programs for the winter of 1969. Soil fertility, soil tillage, crop varieties, and production practices will be the topics for the Crop Production Days. Weed problems and control, diseases and control, and insects and control are the general topics for the Crop Protection Day. One day will be devoted to Crop Production and one day to Crop Protection.

Several counties will have one- or two-day Agronomy Days in which many of the same topic areas will be discussed as covered in the Regional Crop Production Days and Crop Protection Days.

Check below for your Regional Center or county for the meeting of your choice and mark your calendar now. Bring your neighbors and we will see you there!

REGIONAL CROP PRODUCTION OR PROTECTION DAYS

Jan. 3	Normal	Univ. Union Ballroom, Ill. State Univ.	9:30-3:30	Production
7	Peoria	Youth Building Exposition Gardens	10:00-3:00	Production
7	Ottawa	Farm Bureau Building	9:00-3:00	Protection
8	Rockford	Sweden House	9:30-3:00	Protection
9	New Lenox	Bruns Restaurant	9:30-3:00	Protection
10	St. Charles	Kane County Fairgrounds, Randall Road	10:00-3:00	Protection
14	Ottawa	Farm Bureau Building	9:00-3:00	Production
14	Peoria	Youth Building Exposition Gardens	10:00-3:00	Protection
15	Sterling	Emerald Hill Country Club	9:30-3:30	Protection
15	Rockford	Sweden House	9:30-3:00	Production
16	St. Charles	Kane County Fairgrounds, Randall Road	10:00-3:00	Production
16	Bloomington	Illinois Wesleyan Memorial Center	9:30-3:30	Protection
17	Urbana	Illini Union, Rooms A and B	9:00-3:30	Protection
17	New Lenox	Bruns Restaurant	9:30-3:00	Production
21	Mt. Sterling	Farm Bureau Building	10:00-3:00	Production
22	Jacksonville	Blackhawk Restaurant	10:00-3:00	Production
23	Jerseyville	Farm Bureau Auditorium	9:30-3:30	Production
24	Urbana	Illini Union Rooms A and B	9:30-3:30	Production
24	Litchfield	Gardens Restaurant	10:00-3:00	Production
28	Carthage	Extension Center, 550 N. Madison	9:30-3:00	Production
28	Mt. Sterling	Farm Bureau Building	10:00-3:00	Protection
28	Eldorado	High School Auditorium	10:00-3:00	Protection
29	Jacksonville	Blackhawk Restaurant	10:00-3:00	Protection
29	Monmouth	Farm Bureau Building	9:30-3:30	Production
30	Princeton	Farm Bureau Building, Rt. 34 East	9:30-3:30	Production
30	Carrollton	Farm Bureau Auditorium	9:30-3:30	Protection
31	E. Moline	Deere & Co. Auditorium, John Deere Road	9:30-3:30	Production
31	Litchfield	Gardens Restaurant	10:00-3:00	Production
Feb. 4	Carthage	Extension Center, 550 N. Madison	9:30-3:30	Protection
5	Monmouth	Farm Bureau Building	9:30-3:00	Protection
6	Sterling	Emerald Hill Country Club	9:30-3:00	Production
6	Princeton	Farm Bureau Building, Rt. 34 East	9:30-3:30	Protection
7	E. Moline	Deere & Co. Auditorium, John Deere Road	9:30-3:30	Protection
10	Springfield	Heritage House Restaurant, Rt. 66	10:00-3:00	Protection
11	Mattoon	Burgess-Osborne Auditorium	10:00-3:00	Protection
12	Decatur	Farm Bureau Agriculture Center	9:30-3:30	Protection
14	Watseka	American Legion Hall	9:30-3:30	Protection
17	Springfield	Heritage House Restaurant, Rt. 66	10:00-3:00	Production
18	Mattoon	Burgess-Osborne Auditorium	10:00-3:00	Production
18	Eldorado	R. E. A. Rt. 142	10:00-3:00	Production
19	Decatur	Farm Bureau Agriculture Center	9:30-3:30	Production
21	Watseka	American Legion Hall	9:30-3:30	Production

COUNTY AGRONOMY DAYS

County	Location	Time
Jan. 6 DeKalb	DeKalb County Farm Bureau Auditorium	10:00-3:00
14 Adams	Farm Bureau Basement in Quincy	10:00-3:00

County	Location	Time
Jan. 14 Menard	Farm Bureau Auditorium in Petersburg	9:30-3:30
15 Pike	Heritage House in Pittsfield	9:00-3:00
15 Mason	American Legion Hall in Mason City	10:00-3:00
16 Logan	Lincoln Community Center	9:30-3:00
16 Knox	Farm Bureau Auditorium in Galesburg	9:00-3:00
17 Shelby	4-H Center, Fairgrounds in Shelbyville	10:00-3:00
17 Wayne	Fairfield City Hall	9:30-3:00
20 Williamson	Extension Office Meeting Room in Marion	9:30-3:30
21 Livingston	Moose Home in Pontiac	9:30-3:00
27 Hamilton	Hamilton County Courthouse Basement	10:00-3:00
28 Williamson	Extension Office Meeting Room in Marion	7:30 p.m.
29 Carroll	Morman Diehl Auditorium in Mt. Carroll	10:00-3:00
29 Randolph	Farm Bureau Building in Sparta	9:00-12:00
30 Bond	Farm Bureau Building in Greenville	1:00 p.m.
30 Washington	Farm Bureau Basement in Nashville	10:00-3:00
30 McHenry	Farm Bureau Auditorium in Woodstock	10:00-3:00
31 Jefferson	First Presbyterian Church in Mt. Vernon	10:00-3:00
31 DuPage-North	DuPage County Fairgrounds in Wheaton	10:00-3:00
31 Woodford	The Elms Restaurant in El Paso	10:00-3:00
Feb. 3 Henderson	Media High School	7:30 p.m.
3 Logan	Lincoln Community Center	9:30-3:00
4 Jackson	Farm Bureau Building in Murphysboro	9:30-3:30
4 Christian	Holy Trinity Auditorium in Stonington	9:30-3:30
4 Tazewell	Memorial Center in Pekin	10:00-3:00
4 Cass	Farm Bureau Hall in Virginia	10:00-3:00
4 Vermilion	Redwood Inn in Danville	10:00-3:00
5 Edgar	Moose Hall, 134 E. Court in Paris	9:30-3:00
5 Clinton	American Legion Home in Carlyle	10:00-3:00
6 Washington	The Theater in Nashville	10:00-3:00
6 Franklin	Christopher High School	7:00 p.m.
6 Fulton	Farm Bureau Building in Lewistown	9:30-3:30
7 JoDaviess	Farm Bureau Hall in Elizabeth	10:00-3:00
7 Perry	High School Agriculture Room in Pinckneyville	10:00-3:00
7 White	Two Tony's Smorgasbord in Carmi	9:30-3:00
7 Ford	Farm Bureau Hall in Melvin	9:30-3:30
7 Ogle	Farm Bureau Auditorium in Oregon	10:00-3:00
11 Mercer	VFW Building in Aledo	10:00-3:00
12 Marshall-Putnam	High School Auditorium in Henry	10:00-3:00
13 McDonough	4-H Center, Rt. 136 in Macomb	10:00-3:00
13 Stark	Wyoming Agriculture Farm Shop	9:00-3:00
13 Whiteside	Norrish Auditorium in Morrison	10:00-3:00
13 Marion	Salem Theater in Marion	10:00-3:00
14 Kankakee	Redwood Inn in Kankakee	10:00-3:00
14 Clay	Louisville Grade School	9:00-3:00
19 Jackson	Farm Bureau Building in Murphysboro	9:30-3:00
19 Marshall-Putnam	High School Auditorium in Henry	10:00-3:00
19 Kendall	Farm Bureau Building in Yorkville	10:00-3:00
20 Piatt	Community Building in Monticello	10:00-3:00
20 Grundy	Farm Bureau Building in Morse	9:30-3:00
20 Richland	American Legion Building in Olney	9:30-3:00
22 Clark-Cumberland	High School in Casey	10:00-3:00
25 Jasper	Newton Court Room	10:00-3:00
26 Monroe	Farm Bureau Hall in Waterloo	7:30 p.m.
26 St. Clair	Turkey Hill Grange in Belleville	9:00-3:00
26 Crawford	Lincoln Theater in Robinson	10:00-3:00
28 Edwards	Farm Bureau Building in Allison	10:00-3:00
Date Unknown		
Fayette		

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crops and soils

January 3, 1969

No. 384

SPRING OAT VARIETY PERFORMANCE IN 1968

	DeKalb			Urbana			Brownstown		
	1968		1966-68	1968		1966-68	1968		1966-68
	bu./A.	lb./bu.		bu./A.	lb./bu.		bu./A.	lb./bu.	
Brave	117	31.8	107	111	35.0	91	110	35.7	85
Clintland	118	35.7	101	98	37.5	84	88	36.2	73
Clintland 64	119	31.0	103	103	33.5	70			
Garland	125	32.5	108	99	34.0	92	91	35.0	73
Goodfield	117	34.4	96	95	36.5	82	84	36.8	70
Jaycee	129	34.2	98	109	36.0	103	109	33.7	91
Newton	127	34.6	102	106	33.5	93	99	37.0	76
Shield	122	33.6	106	105	34.5	91	102	33.5	78
Tippecanoe	128	33.8	102	87	33.0	76	83	34.3	67
Tyler	127	32.0	107	102	34.0	81	90	34.3	67 ^{a/}
Holden	128	32.2	114 ^{a/}	115	34.5	106 ^{a/}	99	35.0	82 ^{a/}
Orbit	133	32.2	117 ^{a/}	119	34.5	113 ^{a/}	103	34.0	
Portal	127	32.8	120 ^{a/}	105	33.0	98 ^{a/}	99	35.3	83 ^{a/}
Pettis	127	35.0		95	36.5				
Bonkee				94	34.5	72	94	34.3	75

^{a/} 2-year average. Data provided by C.M. Brown and J.E. Dillon.

Pettis is the newest variety. It was released by the Missouri Agricultural Experiment Station in 1967. It is early maturing and is reported to have a high test weight, high groat percentage, and high yield potential. Pettis has excellent tolerance to Barley Yellow Dwarf Virus and some races of stem rust. The seeds of the variety are red and moderately plump. The straw is about 1 inch shorter and slightly weaker than that of the older variety Mo. 0-205.

Portal was released by the Wisconsin Agricultural Experiment Station in 1967. It is a relatively late variety for Illinois. It is similar to Garland, yielding 2 to 3 bushels more per acre. The test weight and straw strength of Portal are slightly less than those of Garland. Portal matures a little later than Garland.

Portal is a yellow-hulled variety with resistance to smut and some races of stem and crown rust.

Holden was released by the Wisconsin Agricultural Experiment Station in 1967. It matures one day later than Garland and yields about 5 bushels more per acre than Garland. It is a yellow-hulled variety with plump kernels and good test weight. It is resistant to older races of crown rust and intermediate to susceptible to the newer races. It has resistance to smut and some races of stem rust.

Orbit is a recent release from Cornell University in New York. It has a white kernel and a heavy test weight. It is short strawed, 6 to 10 inches shorter than Garry. It is smut resistant and moderately resistant to crown rust and stem rust. Orbit is a late-maturing variety for Illinois, maturing 3 days earlier than Garland.

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AGRONOMY NEWS

crops and soils

March 17, 1969

No. 385

SOYBEAN WEED CONTROL

Most soybean growers use a combination of herbicides and good cultivation practices to fight their weed-control problems. Although farmers use the rotary hoe on 75 percent of their soybean acreage, they also use the row cultivator on 90 percent. In 1968, preemergence herbicides were used on more than 60 percent of the soybean acreage in Illinois.

To select the treatments that will provide the most effective and economical weed control on your farm, you must know your weed problems and your soil situation. Then you can choose a formulation, as well as time and method of application, that will fit your total program.

PREPLANT HERBICIDES

Preplant herbicides are broadcast before planting and are usually incorporated. There are three preplant soybean herbicides--Treflan, Planavin, and Vernam. They differ in the timing of application and the requirements for incorporation.

Treflan (trifluralin) provides consistent control of grass seedlings--even wild cane and Johnson-grass. Treflan can be applied as early as six weeks before planting. The herbicide should be incorporated within 4 hours after application. Suggested rates vary from 1 to 2 pints per acre, depending on the soil type. Treflan is available as a 5-percent granule formulation, but the granule form also needs thorough incorporation.

Treflan occasionally injures soybeans, but usually does not affect yield. Sometimes, small grains have been injured following soybeans treated with Treflan. The granules appear to have a longer persistence than the liquid.

Planavin (nitralin) controls the same weeds as Treflan. However, higher rates of Planavin are required per acre. Planavin is adapted to soils containing less than 3 or 4 percent organic matter. Planavin can be applied as early as 4 weeks before planting. Incorporation may be delayed as long as 48 hours. Occasionally, enough rain falls immediately after application that incorporation is not necessary.

Planavin will be available in 1969 as a 4-pound-per-gallon, water-dispersible liquid (WDL), as well as in the 75-percent wettable powder form.

Vernam (vernolate) can be used preplant or preemergence. The liquid formulation is more volatile than the granule form, and should be incorporated immediately after application.

Vernam will control annual grasses and nutsedge as well as morning glory. Temporary stunting and leaf crinkling of soybeans often occur, but the yield is not usually affected. The granule can be used preemergence, but slight incorporation will probably improve control.

PREEMERGENCE HERBICIDES

Amiben is a popular soybean herbicide for controlling annual grasses and broadleaved weeds. However, it does not control morning glory. It gives variable control to velvetleaf, jimsonweed, and cocklebur.

Amiben is available in both liquid and granule formulations. The suggested rate varies with soil type, but the full, recommended rate is the most-reliable one. Amiben occasionally injures soybeans, but damage usually is not severe.

Lorox (linuron) provides a broad spectrum of control. It is most adapted to soils containing 1 to 3 percent organic matter. Crop tolerance is close, so rates must be adjusted accurately for soil type. Use no more than 1 pound of Lorox 50W per percent of organic matter in the soil. Lorox is not available in granular form.

Alanap Plus (*Alanap* + *CIPC*) sometimes controls a broad spectrum of weeds, but control and injury have been rather erratic. The CIPC makes it particularly effective on smartweed. *Alanap Plus* is available as a liquid or a granular formulation.

Randox (CDA) controls annual grasses on soils of high organic matter. It is usually used in granular form, in order to minimize skin irritation.

Ramrod (*propachlor*) controls the same weeds as *Randox*, but gives an additional two weeks of control. It is presently cleared for use on soybeans for "seed beans" only.

Lasso (CP-50144) will control the same weeds as *Randox* and *Ramrod*; also, nutsedge. *Lasso* will be less irritating than either *Ramrod* or *Randox*. It performs better on soils containing 1 to 3 percent organic matter. *Lasso* provides control for six to eight weeks, and will be available in both liquid and granular form. Note: Clearance for the granular form is still pending.

Dacthal (DCPA) controls annual grasses and has good crop tolerance. Incorporation improves control. Suggested rates for *Dacthal* 75W vary from 8 to 12 pounds per acre, depending on soil type.

Londax and *Preforan* are two new herbicides that are cleared for "seed beans" only. *Londax* is a two-to-one combination of *Ramrod* and *Lorox*, available either as a 45-percent wettable powder or as a 15-percent granule. *Preforan* will be available as a 3-pounds-per-gallon emulsifiable concentrate.

POSTEMERGENCE HERBICIDES

Preemerge (dinitro) and *Dyanap* (dinitro + *Alanap*) can be applied at the cracking stage when soybeans are just emerging. Dinitro is a contact herbicide that controls emerged weeds. On the other hand, *Alanap* controls emerging weeds.

Tenoran and 2,4-DB are presently both applied over the top, but current research indicates that directed application may be more effective and may cause less potential soybean injury.

Tenoran (*chloroxuron*) controls broadleaf weeds that are 1 to 2 inches tall. Cocklebur, morning glory, and jimsonweed are more susceptible to *Tenoran* than velvetleaf. Adding a surfactant improves control. *Tenoran* is likely to cause a temporary yellowing of soybean plants.

Butyrac 175 and *Butoxone SB* (2,4-DB) can be used for emergency control of cocklebur, morning glory, and giant ragweed. It should be applied during the period from 10 days before bloom to midbloom. Soybeans may be injured, so compare potential loss from weeds with potential herbicide injury.

The use of the rotary hoe and the cultivator should continue to be a part of your weed-control program.

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AGRONOMY NEWS

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PREPLANT HERBICIDES FOR CORN

Recent research and field experience indicate the feasibility of applying some herbicides prior to planting, where you wish to commit yourself to broadcast application and feel that the added cost is justified.

Atrazine (Aatrex) is the major preemergence corn herbicide currently available for preplant application. Early spring and even fall applications have been tried; however, research indicates that the closer to corn planting time atrazine is applied, the more successful the application is likely to be. Make applications no earlier than two weeks before planting.

Apply atrazine to the soil surface or incorporate it lightly with a shallow disking or similar operation. The field cultivator has been successfully used for incorporation, but results have not always been quite as good as with a disk. The depth and thoroughness of incorporation will depend on many factors--type of equipment, depth of operation and other adjustments, speed, soil texture, and the physical condition of the soil.

With so many factors involved, exact specifications for incorporation cannot be given. One principle to keep in mind is that the deeper the herbicide is incorporated and the more soil that is mixed with it, the more diluted it will be. Excessive incorporation and dilution may decrease the herbicide's effectiveness. As a rule of thumb, incorporation devices (such as a disk) usually move the herbicide only to about one-third to one-half the depth at which the implement is operated.

The major reason for incorporating some herbicides is to reduce the loss through the soil surface. Since the loss of atrazine is not very rapid, incorporation is by no means essential. Another advantage for incorporating some herbicides may be moving the herbicide into soil where there is sufficient moisture for weeds to absorb the herbicide. Incorporation of atrazine may be beneficial in a relatively dry year, but may show no advantage or even be detrimental when moisture is adequate.

Atrazine is very effective for the control of many broadleaved weeds, and is often quite satisfactory for annual grass weeds. However, under unfavorable conditions, it may not adequately control some annual grasses such as giant foxtail, crabgrass, and panicum. Considerable research has been done in the attempt to find another herbicide that could be combined with atrazine for improved grass control.

Sutan has recently been introduced as a corn herbicide. One of Sutan's strong points is good control of grass weeds. Since Sutan is volatile, it must be incorporated into the soil. Sutan can be used alone as a broadcast preplant incorporated treatment at a rate of 2/3 gallon per acre (4 pounds per acre of active ingredient). In trials thus far, corn tolerance appears to be adequate, although perhaps not as good as with some other herbicides. Trial use of Sutan, alone or in combination with atrazine, is suggested for 1969.

The major interest in Sutan is in combination with atrazine (Aatrex) as a broadcast preplant incorporated treatment. In research trials, weed control from this combination has been quite good. One-half gallon (3 pounds per acre of active ingredient) plus 1-1/4 pounds of Aatrex 80W is suggested. The Sutan can improve grass control and Aatrex, even

at a reduced rate, can still control many broadleaved weeds. The 1-1/4 pounds of Aatrex should be adequate for some broadleaves, like smartweed, but may not always give complete control of others, like velvetleaf.

Research suggests that other herbicides for possible combination with atrazine, such as Ramrod or Lorox, often do not maintain their effectiveness sufficiently when incorporated.

In the future, combinations such as Ramrod and atrazine might be applied after final seedbed preparation just prior to planting; but research suggests that Ramrod alone or in combination with atrazine should not be incorporated. Present labels do not specify preplant application for Ramrod, alone or in combination with atrazine.

Preplant-incorporated applications offer an opportunity for applying herbicide, liquid fertilizer, and possibly insecticide at the same time--if the chemicals are compatible and if the incorporation gives the proper placement for each chemical. Check labels for specifics.

Preplant applications do provide an opportunity to make some herbicide applications before the busy planting season. This could be particularly advantageous for custom applicators and for farmers with large acreages; it would require fewer attachments on the planter. However, the weather will often dictate the actual time for application. So, where preplant applications are planned, you should also have an alternate plan, in case the preplant application is not possible.

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No. 387

PREEMERGENCE HERBICIDES FOR CORN--1969

In 1969, preemergence herbicides are likely to be used on more than half of the corn acreage in Illinois. Although present herbicides are not totally effective, farmers have been quick to realize the benefits these chemicals offer. Herbicides help control weeds in the row, allow faster cultivation, and can control weeds during wet weather when cultivation is impossible. On large acreages, the control provided by the use of herbicides adds flexibility, making the time of cultivation less critical. Sometimes, the number of cultivations can be reduced.

AATREX (atrazine) is one of the most popular herbicides for corn. It controls both broadleaved and grass weeds. It is particularly effective on many broadleaves like smartweed. Corn has very good tolerance to preemergence applications. Aatrex is most effective on light soils that are relatively low in organic matter, but it is also effective on soils with more organic matter if the rate is increased. However, do not exceed the rates specified on the label.

Aatrex (atrazine) will often persist long enough to give weed control for most of the season. But unless you take proper precautions, enough atrazine may remain in the soil to damage some crops the following year. Wherever you apply Aatrex in the spring, do not follow that fall or the next spring with small grains, small-seeded legumes, or vegetables.

Soybeans planted where atrazine was used the previous year may show some effect, especially if more than the recommended amount was used or if some areas received excessive amounts (the ends of fields, for instance). In Illinois research trials, where the recommended rates of atrazine are carefully and accurately applied, soybeans usually have not been damaged enough to significantly affect yields.

For use on corn, Aatrex is available from the manufacturer only as a wettable powder for spray application. Mix adequately, provide adequate agitation, and follow other precautions on the label to assure uniform application.

RAMROD (propachlor) has given very good control of annual grass weeds, often providing better initial control and usually for slightly longer than Radox. Ramrod has also controlled pigweed and given fair control of lambsquarter. It performs better on the darker soils of the state than on lighter ones. Corn has good tolerance to Ramrod.

Ramrod is available as a 65-percent wettable powder and as 20-percent granules. Ramrod is not as irritating to handle as Radox, but take precautions to avoid irritation to the skin and eyes. Some individuals are more sensitive than others to such irritation.

A good program, especially on the moderately dark to dark soils, is to use Ramrod (as a spray or as granules) at planting time for the control of annual grass weeds, followed with an early postemergence application of 2,4-D to control broadleaved weeds.

RADOX (CDAA) is adapted primarily to the darker soils that contain a moderate to high amount of organic matter. Do not use Radox on sandy soils. It controls annual grass weeds and pigweed for about four weeks. A preemergence application of Radox can be followed with an early postemergence application of 2,4-D, in order to improve broadleaved weed control. Most Radox is used in granular form to reduce irritation. But even with granules, be careful to avoid irritation to the skin and eyes.

LESSO has been tested in research trials for several years and has been cleared for use on corn and soybeans in 1969. The tolerance by both to *Lasso* appears to be good. *Lasso* is similar to *Ramrod* in some respects. *Lasso* has given good control of annual grass weeds and may give some control of pigweed and lambsquarter. Being less soluble than *Ramrod*, *Lasso* may hold up better when there is fairly heavy rainfall. But under minimal rainfall conditions, *Ramrod* may sometimes have a slight advantage.

Lasso may control weeds a little longer than *Ramrod*, and may perform a little better than *Randox* or *Ramrod* on soils relatively low in organic matter. *Lasso* is likely to have its greatest adaptation on the moderately dark to dark soils, ones with more than 3-percent organic matter. *Lasso* is less irritating than *Randox* or *Ramrod*, but precautions should be taken with *Lasso* to avoid irritation, especially by certain sensitive individuals.

Although *Lasso* is cleared for use on both corn and soybeans, the manufacturer will probably promote it more for soybeans, since *Ramrod* is not fully cleared for soybeans. *Lasso* will be available as a liquid emulsifiable concentrate for spraying, perhaps also in granular form. The liquid has received Federal clearance, and clearance for granules is anticipated.

2,4-D ESTER is available in liquid and granular form. If rain falls soon after application, *2,4-D* can control annual grasses and broadleaved weeds. Easy to handle, *2,4-D* presents no residue problems and is low in cost. However, it generally does not control weeds as well as the herbicides previously discussed. Although injury to corn is usually not a serious problem, this does occur occasionally. Only the ester--not the regular amine form of *2,4-D*--should be used for preemergence application.

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AGRONOMY NEWS

crops and soils

April 2, 1969

PREEMERGENCE HERBICIDE COMBINATIONS FOR CORN

No. 388

Each herbicide has its own advantages and disadvantages. Some are best for controlling grass weeds, others are best for broadleaves. Some are best on light soils, others on dark ones. Rainfall requirements differ. Some "hold up" better than others under heavy rainfall. Some do not persist long enough to give weed control for the entire season. Others may persist longer than desired, affecting later crops. Herbicides with limited crop tolerance may be more acceptable when mixed at a reduced rate with another herbicide that has better crop tolerance.

Considerable research has been done on herbicide combinations, seeking better control of a greater number of different weed species, over a wider variety of soil types, and under a broader range of weather conditions. An appropriate control period can sometimes be achieved, while minimizing herbicide residue. Of the hundreds of possible combinations, only a relative few have "made the grade" and have been cleared.

Some combinations may increase the possibility of crop injury or give poor weed control; hence, farmers are advised to use only those that have been adequately tested and approved. There are both prepackaged combinations and those that need to be mixed at time of application.

RAMROD PLUS ATRAZINE, each at a reduced rate, can control both annual broadleaved and grass weeds. This combination has given good weed control in research and field trials. For tank-mixing the individual products, 4-1/2 pounds of Ramrod in a 65-percent wettable powder is suggested, regardless of the soil type. The amount of atrazine to add will vary with the type of soil--1-1/4 pounds of Aatrex 80-percent wettable powder for the light-colored soils low in organic matter, 2 pounds for the darker soils. The reduced rate of atrazine will control many broadleaved weeds, like smartweed, but may be marginal for the control of others, like velvet-leaf. The reduced rate of Ramrod in combination is adequate for the control of many annual grasses. The mixture controls broadleaved weeds better than Ramrod alone, and often controls annual grass weeds better than atrazine alone. The mixture reduces the atrazine-residue problem, and gives more-consistent control on the darker soils than does atrazine alone. This is also true under limited rainfall conditions. The Ramrod-atrazine combination has been one of the better ones tested; it is preferred over most of the others listed below.

KNOXWEED is a combination of Eptam (EPTC) and 2,4-D. Although the possibility of injury to corn exists, this has not been a serious problem. Knoxweed presents no hazard to crops during the next season. It is available in both liquid and granular forms. Do not use it on peats, mucks, or sands. Knoxweed has given somewhat erratic weed control, depending on rainfall and soil moisture. Greater consistency in weed control is likely when rain occurs soon after application.

ROUNDUP is a combination of Ramrod and 2,4-D. It is available as a wettable powder or in granular form. It has given reasonably good early weed control. Although there is some chance of injury to corn from the 2,4-D, no serious problems have developed.

ATRAZINE PLUS LOROX (LINURON) has been available as a prepackaged, wettable-powder mixture. It can also be tank-mixed on the farm, for preemergence use on field corn. This combination has often given satisfactory weed control, especially on relatively light-colored

soils that are low in organic matter. Using a smaller amount of atrazine in the combination lessens the chance of residue problems with atrazine on later crops. Using less Lorox in the combination reduces--but does not eliminate--the possibility of corn injury. Do not use the combination containing Lorox on sandy soils; injury may result. Adjust rates carefully for the particular soil texture and organic-matter content.

LONDAX, a combination of Lorox and Ramrod, has clearance for use on corn for grain. It contains Lorox and Ramrod in a 1-to-2 ratio, respectively, of active ingredients. This combination has given relatively good weed control in research trials. The control of broadleaved weeds is better than with Ramrod alone. However, the addition of Lorox may present the chance of some crop injury. Londax is available as granules or as a wettable powder.

RANDOX-T controls broadleaved weeds a little better than Radox. However, a preferred alternative would be to use Ramrod or Radox for the control of annual grass weeds, followed with an early postemergence application of 2,4-D for the control of broadleaved weeds. Occasionally, Radox-T causes injury to corn; sometimes the "T" part may carry over in the soil, causing injury to soybeans the following season. Like Radox, it is irritating to handle. So, most of it is used in granular form. Always take appropriate precautions when handling it.

PRIMAZE is available from the makers of atrazine as a prepackaged combination of atrazine and Caparol (prometryne), in a 1-to-1 ratio. Weed control has been fairly satisfactory. With a reduced rate of atrazine, Primaze might lessen the likelihood of herbicide residue affecting subsequent crops. However, Illinois trials suggest that the addition of Caparol may reduce crop tolerance, compared to a full rate of atrazine alone. Some problems with corn injury were experienced in 1968.

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AGRONOMY NEWS

crops and soils

April 20, 1969

No. 389

INCORPORATING PREEMERGENCE HERBICIDES

When a herbicide is applied to the soil surface, many things can take place. What happens depends partly on the chemical and physical nature of each specific herbicide and partly on the soil and atmospheric conditions.

Approximately 1 to 5 pounds of herbicide spread over 43,560 square feet (one acre) produces a very thin "film." For sprays, the 10 to 30 gallons of water applied with the herbicide is simply a carrier--a means of uniformly spreading the herbicide. This small amount of water probably evaporates rather quickly and is of no significance in moving the herbicide into the soil. To obtain the equivalent of 1 inch of water per acre would require about 27,000 gallons.

Part of the herbicide remaining on the soil surface may be lost into the air by volatilization. Some herbicides are much more volatile than others. Higher temperatures usually increase volatilization. The sun's rays shining on some herbicides can cause photodecomposition--a breakdown of the chemical. Moisture moving up through the soil and vaporizing at the soil surface may increase the loss of some herbicides.

Once the herbicide is moved into the soil, mechanically or by rainfall, surface loss is minimized; however, other developments occur. Some herbicides are attached to the clay colloids and organic matter in the soil. How tightly they are attached to the soil complex varies with different herbicides. The degree to which herbicides are adsorbed onto the soil complex also depends on the amount and type of clay and organic matter. In order to be effective, sufficient herbicide needs to remain available for absorption by the emerging weed seedlings.

Herbicides in the soil can be broken down by soil microorganisms. The rate of breakdown depends partly on moisture and temperature. Within limits, soil microorganisms usually become more active as the moisture and temperature increase.

It is usually best to keep the incorporation of herbicides relatively shallow, so that the majority of the herbicide is placed in about the upper 2 inches of the soil. Mixing the herbicide too deep can dilute it and decrease its effectiveness. So, it is usually best to keep the herbicide relatively shallow.

The depth to which herbicide is placed will vary with such factors as type of implement, adjustment, speed, and physical condition of the soil. But as a rule of thumb, the herbicide will usually be placed about half as deep as the depth at which you operate an implement, such as a disk. If you operate a disk about 4 or 5 inches deep, the majority of the herbicide will probably be about 2 inches deep.

Recent research indicates that for most major herbicides and some major weeds, the herbicide can be absorbed by the shoots of the weed seedlings during emergence, and that it is not essential to get the herbicide down into the primary root zone or even into the seed zone. Hence, there is little reason to aim for deep placement. Under relatively dry conditions, incorporation may sometimes be helpful, since this will move the herbicide down into relatively moist soil where there is sufficient moisture for the absorption of the chemical by the emerging weed seedlings.

RANDOX, RAMROD, LASSO, 2,4-D ESTER, AMIBEN, ALANAP PLUS, AND LOROX. They are usually applied to the soil surface, rather than being incorporated. Some of them are relatively soluble, and incorporation plus a fairly heavy rain may leach them too far down into the soil. Some may be more

strongly adsorbed onto the soil complex when incorporated, and therefore not as readily available to the weed seedlings. Incorporation might be possible for some, but this usually doesn't produce any major benefit and is usually not considered worth the extra effort.

ATRAZINE. It can be incorporated, but doesn't have to be. Under relatively dry conditions, incorporation may be beneficial since it would place the herbicide deeper in soil where there is more moisture for absorption of the chemical by the weed seedlings. When rainfall and soil moisture are adequate, incorporation may be of little or no benefit and may even reduce weed control.

Since atrazine is not lost rapidly from the soil surface, there usually is no urgency about incorporation. If you do incorporate atrazine, keep it shallow. After atrazine is applied, if rainfall is delayed but the soil is moist enough for weed seeds to germinate, a shallow disking, rotary hoeing, or harrowing may help.

SUTAN. It is volatile and should be incorporated--preferably as it is being applied. This can be done by mounting a spray boom just ahead of the disk. If Sutan and atrazine are mixed, this combination should be incorporated. The Ramrod-atrazine combination should be applied to the soil surface and not incorporated.

VERNAM. It is a relatively volatile herbicide, so incorporation is usually considered beneficial. However, the manufacturer suggests that the granular form may be applied to the soil surface.

TREFLAN AND PLANAVIN. They should be incorporated--usually, the sooner the better. The manufacturers suggest incorporation within 4 hours for Treflan and within 48 hours for Planavin. The actual rate of loss from the soil surface may vary considerably, depending on soil and atmospheric conditions. There is no "magic switch" that turns on at the end of 4 or 48 hours to make all the chemical disappear; rather, the loss is somewhat gradual.

To retain as much of the chemical as possible, it is usually desirable to incorporate as the chemical is being applied. Many growers have the spray boom mounted just ahead of the disk. However, the time intervals suggested by the manufacturers do indicate some flexibility. Such flexibility is often important for custom applicators with wide spray booms making applications much faster than the grower can disk.

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crops and soils

April 25, 1969

No. 390

SOYBEAN PLANTING IN 1969

Soybeans can be planted as early as corn, but they do not benefit as much from the early planting as corn does. Farms on which corn and soybeans are grown will normally obtain the best performance for the two crops considered together if the corn is planted before the soybeans.

Soybeans will actually germinate at cooler soil temperatures than corn, but growth is very slow at soil temperatures below 50° F. Soybeans that are planted very early may have a greater weed problem than ones planted later, because of the slower growth rate of soybeans compared with some cool-season weeds.

Although soybeans require more moisture in the soil than corn to germinate, soybean germination is reduced by excessive moisture. Water-soaking the seeds will retard germination. A water-soaked soil has little free oxygen and may reduce soybean seed germination. Soybeans that are planted early have a little greater risk of excessive soil moisture; late plantings risk inadequate soil moisture for germination.

Late-maturing varieties benefit more from early planting than ones that mature early. The late-maturing varieties usually yield more than early ones. Early planting in the southern half of Illinois may be between April 25 and May 7. For the northern half of the state, this period would be around May 1 to May 15.

If plantings are made late, midseason varieties are normally preferred over those that mature early, because they yield more. Narrow rows are more beneficial to yield when planted late. Soybeans make less vegetative growth if they are planted late and if their leaf canopies do not completely cover the area between rows (36- to 40-inch rows). Soybeans grown in 20-inch rows have averaged about 15-percent higher in yield than soybeans grown in 36- to 40-inch (or wider) rows.

Soybean varieties are classified into maturity groups. Group I varieties are early to midseason in the northern tier of Illinois counties. Groups II, III, IV, and V are also found in the state. The Group V varieties are full-season in the southern Illinois counties along the Ohio River. The higher-yielding, adapted, and widely available varieties in their order of maturity from the earliest to the latest are: Group I--Chippewa-64, Hark, and A-100; Group II--Harosoy-63, Corsoy, and Amsoy; Group III--Wayne and Adelphia; Group IV--Clark-63, Bellatti L-263, Custer (soybean cyst-nematode resistant), and Kent; Group V--Hill. Groups I and II are adapted to the northern quarter of Illinois, Groups II and III in central and northern Illinois, Groups III and IV in southern and central Illinois, and Group V only in the southern tip of the state.

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ANA, ILLINOIS

AGRONOMY NEWS

crops and soils

July 5, 1969

No. 391

GET POISON IVY BEFORE IT GETS YOU

The best way to avoid poison ivy is to leave it alone. But that isn't always possible. Youngsters have a way of getting into poison ivy, and more than one farmer has found himself scratching after mending fences or clearing brush. Times change. Now, with modern weed killers, poison ivy can be controlled easily.

IDENTIFICATION. First, be sure that you can recognize poison ivy. It can vary greatly, both in its growth habit and leaf appearance. It can spread along the ground; grow as a vine on fences, walls, and trees; and even grow as a shrub.

The giveaway is the leaves. Three leaflets make up each leaf. They are usually shiny, but they may also be a dull green. The leaflet edges may be smooth, toothed, or lobed. You may even find all of these variations on the same plant.

THE POISON. The skin irritant in poison ivy is in the sap of the roots, stems, leaves, and berries. Apparently, some people are more immune to it than others. *But don't push your luck. People who consider themselves immune may become susceptible after sufficient exposure.*

The poison is potent and can cause severe inflammation. The poison can also be transferred from one object to another. It can get on your clothes, garden tools, or your pets--then rub off on you or members of your family. It can even be carried in the smoke from burning poison ivy plants.

CONTROL. Modern weed-killing chemicals offer the easiest and safest method of control. When handled properly, the herbicides mentioned here can do an effective job. But don't allow them to contact desirable plants. To avoid drift, be careful to spray on a calm day, when there is no wind. In all cases, read and follow directions on the label.

Amitrole. This is most effective for killing poison ivy. You may find it under such trade names as Amino triazole, Weedazol, and Poison Ivy Killer. Amino triazole and Weedazol are dry powders for mixing with water. Amitrole-T is similar to amitrole but is formulated as a liquid and has the trade names Cytrol and Amitrol-T. Aerosol cans containing amitrole are a convenient way to spray small patches.

For treating with a small hand sprayer, mix 3 level tablespoons of the commercial preparation containing 50-percent amitrole with 1 gallon of water. For large areas, mix 1 pound of the 50-percent material in 25 gallons of water.

You can apply amitrole from the time the plants make their early spring growth and the leaves reach full size until they begin to change color in the fall. Thoroughly wet the entire plant with the spray, but don't let it contact desirable plants. If there's a chance that you will damage desirable plants by spraying, apply amitrole to ivy leaves with a long-handled brush.

Brush killer. This is the name commonly applied to mixtures of 2,4-D and 2,4,5-T. The mixture kills poison ivy more effectively than 2,4-D alone. Brush killer will also control other undesirable woody plants where the two grow together. Most grasses tolerate 2,4-D and 2,4,5-T better than they do amitrole. However, 2,4-D and 2,4,5-T increase the danger from drifting vapor to other broadleaved plants in the area.

Apply brush killer when the plants reach the full-leaf stage, in the late spring or early summer. If regrowth occurs, repeat the treatment. Do not use a sprayer that has been used for brush killer to spray ornamentals or sensitive crops.

How to Mix Brush Killer Sprays

No. gal. of water	Amount of brush killer*
1	2 tablespoons
3	6 tablespoons
25	1-1/2 pints
100	3 quarts

* For brush killer containing 4 pounds of acid equivalent per gallon.

If you would like more detailed information on poison ivy identification and control, ask your county Extension adviser for a copy of Illinois Circular 850, *Controlling Poison Ivy*.

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AGRONOMY NEWS

crops and soils

May 1, 1969

No. 392

SOYBEAN VARIETY SELECTION

There are five or six leading varieties of soybeans that are well adapted to particular areas of the state. To make a final selection, consider maturity differences, disease resistance, and yield and lodging resistance. Blends of varieties have not consistently exceeded the yield of pure-line varieties in the few tests conducted.

The relative yield record of varieties should be derived from comparative tests for 3 or more years and more than one location in the general area of adaptation. The breeding program of the USDA Soybean Laboratory has evaluated many varieties at several locations in Illinois for many years. The following table shows recent results of the newer varieties developed by the USDA and state-university breeding programs.

Table 1. Soybean Variety Yields, 1966-1968, at Eight Locations

Maturity Group	Variety	DeKalb	Pontiac	Urbana	Girard	Edgewood	Trenton	Carbon-dale	Miller City
		(bushels per acre)							
I	Chippewa 64	45.5	37.7	39.5					
	Hark	48.0	39.0	44.0					
	A-100	48.8 ^{a/}	44.5 ^{a/}	39.4 ^{a/}					
II	Harosoy 63	49.2	39.8	44.7	45.9	37.9	43.3	33.7 ^{a/}	
	Corsoy	55.5	43.5	50.2	47.2	41.4	46.9	33.2 ^{a/}	
	Amsoy	51.9	41.0	48.5	47.0	40.6	47.3	36.1 ^{a/}	
III	Shelby			41.6 ^{a/}	35.8 ^{a/}	33.1 ^{a/}	41.2 ^{a/}	38.4 ^{a/}	
	Wayne			47.5	44.6	44.0	48.0	42.2	
	Adelphia			45.1	39.4	35.1	45.0	41.1	
IV	Clark 63			43.4	36.7	36.1	44.4	40.2	35.5
	Custer			35.6	32.3	30.5	39.0	39.9	40.5
	Kent			45.0	38.8	39.3	47.7	43.9	35.4
	Delmar						41.4	38.6 ^{a/}	35.3 ^{a/}
V	Hill								32.0

^{a/} Two years of data.

Table 2. Soybean Varieties, County Demonstrations, 1968

NORTHERN ILLINOIS																		
County	Chip- pewa 64	Chip- pewa & Hark	Bombay	Hark	A-100	Linda- rin 63	Hawk- eye 63	Haro- soy 63 & Ansoy	Haro- soy 63	Ansoy	Corsoy	Clark 63 & Wayne	Wayne	Adel- phia	Clark 63	Bel- latti L-263	Clark	Kent
Boone	44	46	43	50	44	43	42	48	46	50	48	..	..	..	..	..	..	..
Carroll	..	39	34	46	36	31	..	40	37	47	44	..	..	..	..	..	..	..
Cook	40	43	44	44	41	46	46	47	46	46	52	..	..	..	..	..	..	..
DuPage	37	41	37	44	37	39	41	43	43	44	46	..	..	..	..	..	..	..
Grundy	16	17	20	26	27	32	32	36	33	40	39	39	41	..	35	40	..	..
Lake	33	..	32	31	26	33	30	35	34	32	38	..	..	..	..	..	..	..
LaSalle*	27	33	36	32	38	..	41	40	40	43	49	..	..	..	..	..	..	..
Mercer	25	29	28	29	29	29	31	32	31	35	35	..	45	..	..	..	..	..
Will	19	21	24	22	22	24	21	25	27	33	28	..	..	..	..	..	..	..
Winnebago*	34	28	35	41	36	34	36	..	..	40	42	..	..	..	..	..	..	..
CENTRAL ILLINOIS																		
Christian	..	..	..	..	..	..	..	..	..	36	37	..	38	..	34	..	..	..
Douglas	29	26	16	26	..	32	32	32	..	34	32	..	33	27	30	31	..	..
Edgar	..	..	..	..	..	50	45	53	46	55	48	53	48	48	46	45	..	..
Ford	34	28	32	23	26	32	37	..	36	35	38	..	37	..	..	..	..	..
Fulton	..	..	..	38	..	36	31	38	36	36	36	37	37	34	34	40	..	..
Henderson*	..	..	..	..	..	38	34	39	36	40	42	..	42	..	..	..	..	..
Iroquois	..	39	..	39	38	43	42	45	43	46	51	..	47	..	..	..	..	..
Kankakee*	..	..	..	..	..	32	36	40	36	44	38	42	42	41	40	42	..	..
Knox	41	49	43	44	45	46	48	48	46	47	50	..	55	..	..	..	..	..
Livingston	..	39	..	38	..	36	37	38	39	39	43	35	39	39	32	32	..	..
Logan	24	..	..	17	12	18	26	..	24	24	22	25	24	22	26	28	..	..
Macon	..	..	..	..	..	33	45	34	36	36	42	47	52	43	48	50	..	..
Mason*	..	..	..	..	..	39	30	34	37	41	42	36	38	31	37	41	..	..
McDonough	..	..	..	..	..	26	31	29	30	33	33	38	37	35	43	45	..	..
McLean	..	..	..	..	..	33	39	41	40	39	44	47	45	41	43	47	..	..
Menard**	..	..	..	..	..	38	34	44	38	45	40	44	43	43	42	45	..	..
Morgan	..	..	..	..	..	42	41	46	44	46	47	46	48	43	41	44	..	..
Peoria	..	..	..	..	..	37	36	40	33	40	38	43	40	36	..	..	..	..
Schuyler	..	..	..	39	..	41	37	41	40	45	44	40	45	40	34	39	..	..
Stark	..	..	..	36	35	36	39	43	41	41	41	40	41	41	..	..	..	..
Tazewell	..	..	..	..	..	35	36	42	38	33	37	43	40	44	36	44	..	..
Warren**	31	32	25	35	34	34	36	38	37	42	43	..	46	..	..	..	..	..
Woodford	43	44	..	44	40	46	44	47	45	50	55	..	..	..	..	..	..	..
SOUTHERN ILLINOIS																		
County	Linda- rin 63	Hawk- eye 63	Haro- soy 63 & Ansoy	Haro- soy 63	Ansoy	Corsoy	Clark 63 & Wayne	Wayne	Adel- phia	Clark 63	Bel- latti L-263	Clark	Kent	Delmar	Custer	Hill	Dare	
Clay	..	..	..	..	..	..	34	32	31	31	33	32	..	30	28	..	..	
Crawford	..	..	..	..	42	..	50	43	46	43	41	50	42	35	44	..	38	
Gallatin	..	..	..	..	..	..	34	..	31	37	40	..	36	40	20	30	..	
Jersey	..	..	..	..	..	..	41	44	..	64	31	..	40	52	..	..	..	
Macoupin	42	35	53	49	46	49	46	46	42	45	45	..	..	..	..	..	..	
Madison	48	46	53	50	54	57	53	52	55	54	54	..	..	..	..	..	..	
Monroe	..	..	..	..	27	29	32	34	35	30	34	34	33	29	32	28	31	
Montgomery	37	34	43	41	42	36	36	38	39	34	34	..	..	..	..	..	..	
Perry	..	..	..	..	..	..	36	36	32	36	37	35	44	32	37	..	..	
Pope-Hardin	..	..	..	..	..	..	32	28	29	28	32	32	31	25	48	40	37	
Randolph	..	..	..	..	..	..	34	28	31	37	37	36	38	37	36	34	38	
Richland	..	..	..	..	..	..	..	35	..	..	31	31	31	..	29	34	34	
Shelby	43	40	40	35	47	42	47	51	48	30	19	27	..	..	..	..	..	
Wayne*	..	..	..	..	..	..	34	35	34	35	34	34	38	36	30	19	27	
White*	..	..	..	..	..	..	21	24	22	26	26	26	28	26	24	..	..	

* Average of two tests.

** Average of three tests.

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AGRONOMY NEWS

crops and soils

May 17, 1969

POSTEMERGENCE HERBICIDES FOR CORN AND SOYBEANS

No. 393

CORN

2,4-D. The major herbicide used after the crop and weeds are up is still 2,4-D. Its use has remained relatively constant for several years, and it is now applied to about 40 percent of the Illinois corn acreage.

The main point to remember about 2,4-D is that it should be applied *early*, when weeds are small and are easiest to kill. Don't wait until weeds are large and difficult to kill. By the time the weeds have grown large, they are already competing with the corn. An application of 2,4-D can be made almost anytime to corn. Until the corn is about 8 inches high, 2,4-D can be broadcast over the top; after that, "drop nozzles" should be used to keep the 2,4-D out of the whorl.

Some persons want to know each year whether corn can be sprayed during tasseling or silking. The issue of damage by 2,4-D at that stage is a somewhat controversial one. However, the main point is that for good weed control, the spraying should have been done much earlier anyway.

Some corn is damaged each year by 2,4-D. It is virtually impossible to eliminate such damage. The chemical usually makes corn brittle for a week or ten days. If a strong wind comes up, some corn may be broken off. Some may bend near the base. This is often called "elbowing."

To help avoid damage, be sure to apply 2,4-D at no more than the recommended rate. The suggested rates per acre for broadcasting are: 1/6 pound, low-volatile ester; 1/4 pound, high-volatile ester; or 1/2 pound, amine. If the application is not broadcast, apply proportionately less for the area that is actually treated. Nozzles can be directed in toward the row area, but be sure to adjust the rate so that excessive amounts are not applied to the corn.

If you use a formulation with 4 pounds of 2,4-D per gallon, each quart will contain 1 pound; each pint, 1/2 pound; and each half-pint, 1/4 pound. Thus, it would take 1 pint of amine formulation to get 1/2 pound of 2,4-D. A gallon of 2,4-D amine (with 4 pounds of 2,4-D per gallon) would be enough to broadcast 8 acres (4 lb./gal. ÷ 1/2 lb./A. = 8 acres). A gallon of 2,4-D (containing 4 pounds of 2,4-D high-volatile ester) would be enough to broadcast 16 acres (4 lb./gal. ÷ 1/4 lb./A. = 16 acres). Try to avoid cultivation during that week-to-ten-day period after applying 2,4-D--particularly if the corn seems to be brittle and is so tall that it might be broken by the cultivator.

An amine formulation of 2,4-D will help reduce the possibility of injury to nearby, sensitive plants. The amine is much less volatile than the ester. However, fine-spray particles of either amine or ester can drift, so try to spray when there is little or no wind. Using a relatively low pressure (20 to 30 p.s.i.) and adequate water will also help reduce drift. A common coverage is 5 to 10 gallons of spray per acre.

During the past few years, there has been some use of oil-soluble amine formulations of 2,4-D. Esters are usually formulated in oil; most amines are not. Being formulated in oil, the oil-soluble amines are said to be about equal to the esters in effectiveness, with the safety features of other amines. The basic ingredient is still 2,4-D. As long as the appropriate rate is used, weed control has generally been comparable with that of other 2,4-D formulations.

Banvel (dicamba). This now has federal clearance for use as a postemergence treatment for corn. It is similar to 2,4-D in some respects and is intended primarily for the control of broadleaved weeds. Corn has relatively good tolerance to Banvel--at the recommended, postemergence rates. Banvel controls smartweed better than 2,4-D. Atrazine is also quite good for this purpose.

Although only a limited amount of Banvel has been used in Illinois, there have been a number of cases of injury to soybeans in nearby cornfields. Unless some solution can be found to reduce the risk of injury to soybeans, this herbicide probably will not be widely used in Illinois.

Atrazine. It can be used as an early, postemergence application--until weeds are 1-1/2 inches high, but within 3 weeks after planting. A regular preemergence application at planting time or shortly afterward (or possibly a preplant application) is generally preferred. But if the application is delayed for some reason, the postemergence treatment is often satisfactory. If atrazine is used after weeds have emerged, the addition of oil formulated especially for this purpose has generally

increased effectiveness. On the relatively light-colored soils in Illinois, a regular preemergence application of atrazine is likely to be one of the most-successful treatments. On the relatively dark soils of the state, there is some interest in the atrazine-oil treatment. Research and field experience suggest that for those relatively dark soils, 2-1/2 pounds of atrazine 80W plus 1 gallon of oil per acre may be just as effective initially, sometimes more so, than a preemergence application of 3-3/4 pounds of atrazine 80W per acre.

As with other herbicide applications, the results of using atrazine and oil will be influenced by many factors, and the results are not always consistent. Early application is important, when grasses are small. This is especially true for the control of annual grasses. If the rate of atrazine is reduced below that normally recommended for preemergence application, the length of control during the season may be reduced. A reduced rate applied early in the postemergence period may lessen the possibility of residual activity on other crops the following season. But if applied relatively late, even the reduced rate of atrazine may cause residue problems.

Although corn has displayed excellent tolerance to atrazine alone, corn has also shown a general stunting sometimes where oil was added. During 1967 and 1968, there were a few cases of fairly severe injury to corn where atrazine and oil were used. Weather conditions, stage of growth, rate of growth, genetic differences, and rate of herbicide used with oil seem to be some of the factors involved.

SOYBEANS

Tenoran (chloroxuron). This can be applied when broadleaved weeds are less than 1 to 2 inches high and grass weeds are no more than a half inch. Under favorable conditions, Tenoran may give fairly good control of many broadleaved weeds. Velvetleaf is more difficult to control; it should be not over 1 inch when treated. Although intended primarily for the control of broadleaved weeds, Tenoran may give some control of grass if you apply it under favorable conditions when grass weeds are very small.

The major interest in Tenoran would be as a possible control for some of the broadleaved weeds, where a preemergence herbicide such as Treflan had been used. Control with Tenoran has been somewhat erratic; also, soybeans have usually been injured at the rates required for weed control. However, Tenoran injury to soybeans may not necessarily affect the final yield.

2,4-DB. This is now sold under several trade names, including Butoxone SB and Butyrac 175. It can be applied from 10 days before soybeans begin to bloom until midbloom. Consider this herbicide for emergency situations where cocklebur is quite serious, as in some bottomland areas. The chemical may also give fairly good control of annual morning glory and giant ragweed. But do not expect good control of most other weeds found in Illinois soybean fields. Soybeans may show early wilting, with a later curving of the stems. Some stem cracking and proliferated growth may occur at the base of the plants. Lodging may be increased. If excessive rates are applied or unfavorable conditions exist close to time of treatment, yields could be reduced. Carefully follow the application rates specified on the label.

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AGRONOMY NEWS

crops and soils

June 16, 1969

No. 394

CONTROL FENCEROW WEEDS EASILY

Are you looking for an easy way to control weeds in your fencerows? Try spraying. Farmers who have tried it are enthusiastic about the results. It will keep fencerow weeds from spreading to your fields, and will keep your fencerows looking neat. Spraying sure beats struggling with a mower on a hot July day. Spraying will also do a better job of keeping down regrowth and the production of weed seeds. The smaller the weeds, the easier they are to kill. June is usually the best time. If some regrowth occurs, you may want to spray again later in the summer.

A GOOD SPRAY PROGRAM

1. Put 50 gallons of water in your spray tank.
2. Add 5 pounds of Dowpon just as it comes from the container.
3. Add 1 pound of 2,4-D. That's the same as 1 quart if you're using 2,4-D with 4 pounds of active ingredient per gallon.

This will give you enough spray to cover an acre of fencerow. That's about the same as 2 miles of fencerow 4 feet wide, or one time around 160 acres.

If there are any susceptible crops or plants in the vicinity, it would be safer to use the amine rather than the ester form of 2,4-D. Use a nozzle that will apply a fairly coarse spray. Some farmers use a regular garden-hose nozzle. To help prevent drift, spray during a day when there is little or no wind. Dowpon and the amine form of 2,4-D don't volatilize like 2,4-D ester, so there isn't so much danger to nearby plants unless the spray is too fine and the particles drift to susceptible plants.

Dowpon controls grasses, and the 2,4-D controls broadleaved weeds. You can adjust the amounts of material given above to fit your specific situation. If the grasses are mostly annuals (like foxtail) and they are only 2 or 3 inches high, 2 or 3 pounds of Dowpon should be enough. Lowering the rate should also reduce damage to desirable perennial grasses (bluegrass, brome grass, and others). If you have perennial grasses like Johnson grass in the fencerow, you may want to increase the amount of Dowpon to about 10 pounds per acre.

If broadleaved weeds are your main problem, you could use 2,4-D alone without Dowpon. One pound of 2,4-D per acre should kill most broadleaved weeds, without killing desirable grasses. If you have Canada thistles that 2,4-D won't control, you can spot-treat them with amitrole or amitrole-T.

THE SMALLER THE WEEDS, THE EASIER THEY ARE TO KILL

Don't let your livestock graze fencerows treated with Dowpon, amitrole, or amitrole-T. Although 2,4-D is not highly toxic, it may make some poisonous plants more palatable, so take precautions. Check product labels for more-specific information on the use of these herbicides.

Soil sterilants, such as chlorate mixtures, Pramitol, or high rates of AAtrex (atrazine) or Princep (simazine), are sometimes used in fencerows to kill the vegetation for a longer time. But more-permanent sterilization may leave the ground bare and make it subject to erosion. It also destroys wildlife cover. Most farmers prefer temporary treatment that will allow desirable vegetation to grow again in the fencerow.

In warm, moist weather, Dowpon and 2,4-D usually decompose well enough in 4 to 6 weeks to allow newly seeded grasses to grow. This fall, you may want to seed a desirable grass, such as brome grass, in the fencerow. A good competitive grass stand will help keep out undesirable annual grasses and broadleaved weeds.

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URBANA, ILLINOIS



AGRONOMY NEWS

crops and soils

June 23, 1969

No. 395

AGRONOMY DAY--JUNE 26

Wheat/Oats/Alfalfa/Soybeans/Corn/Fertilization/Environmental Quality

These and related items of interest will be shown at the annual Agronomy Day, June 26, at the Agronomy South Farm, in Urbana. Research results will also be discussed.

The Agronomy South Farm is located south of the main campus, a quarter of a mile south of Florida Avenue on St. Mary's Road. It is south and east of the Assembly Hall.

Tours begin at 7:00 a.m. Tours will be starting from the headquarters area until 1:00 p.m. Come early to be sure to see all the plots.

The stops and speakers for this year's program will be:

1. CORN FOR SPECIFIC PURPOSES, *Alexander*
2. MICRONUTRIENT SURVEY, *Walker and Hughes*
3. ALFALFA SEEDING, *Graffis*
4. PLANT DISEASES, *Britton*
5. WHAT'S NEW--CHEMICALS, *Slife*
6. TILLAGE, *McKibben and Oschwald*
7. WEED CONTROL AND SOIL O.M. CHART, *McGlamery and Alexander*
8. SOYBEAN FERTILITY, *Aldrich and area agronomists*
9. NITROGEN--WHAT IS IT AND HOW MUCH? *Hageman*
10. WATER POLLUTION, *Welch*
11. OAT PRODUCTION, *Brown*
12. WHEAT PRODUCTION, *Weibel and Millis*
13. INSECT REPORT, *Petty and Moore*
14. ALFALFA VARIETIES, *Hittle and Miller*
15. SOYBEAN PRODUCTION, *Pendleton*
16. CORN FERTILITY, *area agronomists*

Food will be available on the grounds.

Bring your neighbor and enjoy a day seeing new varieties and fertilization and cultural practices at the Agronomy South Farm, June 26, on Agronomy Day.

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NA, ILLINOIS



AGRONOMY NEWS

crops and soils

August 10, 1969

No. 396

SEEDING ALFALFA AND OTHER FORAGE CROPS IN LATE SUMMER

Alfalfa, red clover, and the perennial grasses (commonly used in pastures and hay fields in Illinois) can be seeded in August or early September throughout the state. Seedings should be made by mid-August in the northern quarter of Illinois; they can be made as late as mid-September in the southern quarter of the state. When moisture is in good supply at seeding time and after seeding, there is little chance of stand failure or winter injury. However, if a drouth period continues through August and September, seedings made during such a period may be late in emerging and small in size, and may fail to survive the winter.

Varieties that have vigorous seedlings should be chosen for late-summer seedings. The Flemish alfalfas, for example, have more vigorous seedlings than Vernal. Stands of Vernal have frequently been inferior to those of Flemish varieties when August seedings were made during drouthlike periods. When seedbeds are well supplied with moisture, Vernal can be successfully established if the seeding is made early in the desired seeding period. If the seeding is made late in the desired seeding period, a variety with vigorous seedlings should be chosen.

Late-summer seedings do not need a companion crop because weeds are seldom a problem. No clipping or harvesting should be done to late-summer seedings. Weeds that could become a problem are usually killed back by frost. The crop growth that accumulates by late fall is needed for insulation and to trap snow. This growth should not be removed from new seedings.

Check the fertility status of the soil before the seedbed is prepared. Apply lime if needed to bring the pH to above 6.5, preferably to 6.8 or 7. Phosphorus and potassium test levels should be in the high range. Enough phosphorus can be supplied at this time to carry the expected crop for four years. However, do not apply potassium for more than two years.

Calculate the pounds of phosphorus needed for four years by multiplying the total number of tons of expected hay yield by 11 (there are 11 pounds of P_2O_5 per ton of legume-grass hay). Soils having a low phosphorus-supplying power will require 100 percent of this amount plus the starter. Soils with a high phosphorus-supplying power will require the starter and only 50 percent of the phosphorus removed by the crop. Information on phosphorus-supplying power of soils is given in the 1969 Agronomy Handbook, available through county Extension offices.

Starter amounts of phosphorus needed vary with soil P_1 test levels. Soils with a P_1 test of 10 to 15 need 90 to 150 pounds of P_2O_5 per acre for broadcast seeding and 30 to 90 pounds of P_2O_5 per acre for band seeding. Soils testing 60+ for P_1 need no additional P_2O_5 for broadcast seeding but should receive 30 pounds of P_2O_5 for band seeding to encourage early vigorous seedling growth. Recommendations for other P_1 test values are given in Table 9 of the 1969 Agronomy Handbook.

Potassium needs are determined from soil test results. Up to two years of potassium needs may be incorporated into the seedbed unless needs exceed 275 to 300 pounds of K_2O . Rates near 250 to 300 pounds of K_2O should be disked deep into the seedbed to reduce the possibility of fertilizer burn to the seedlings. If yields of 6 or more tons are obtained the first hay year, the annual maintenance program (based on removal and soil-supplying power) should begin in September of the first hay year rather than the second hay year.

Low amounts of potassium applied at seeding time may be beneficial for seedling growth. It may be broadcast and worked into the seedbed or applied as a band under the seed. When applied as a band, the amount used should not exceed 40 pounds of K_2O per acre. On soils having less than 2 percent organic matter, 10 to 15 pounds of nitrogen per acre may also be included in the starter fertilizer. Little or no benefit can be expected from nitrogen on soils with higher organic matter.

A grain drill equipped with band-seeding tubes and press wheels for each seeded row is an excellent tool for late-summer seedings. A corrugated-roller seeder is also a good tool. With the grain drill, the starter fertilizer can be placed about an inch into the soil; the seed, on the soil surface directly above the fertilizer band. The press wheel should then be rolled directly over the seed, using the wheel to press the seed into the soil. Alfalfa seed and most of the small-seeded forage crops emerge best if they are seeded 1/4 to 1/2 inch deep--the approximate depth produced by using press wheels or corrugated rollers. Some seed will be near the soil surface, but the majority of the seed will be covered to about the desired depth.

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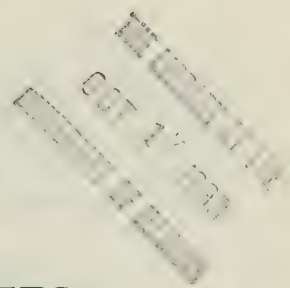
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AGRONOMY NEWS

crops and soils

September 22, 1969

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1969 WHEAT RESULTS

The 1969 wheat yields in Illinois ranged from exceptional to below average. The result was an average yield for the state of 3.5 bushels an acre below the record yield of 41 bushels per acre in 1966. At one time, the crop looked better than this. Excessive lodging and rain that delayed harvesting in some sections contributed to the decline.

Seed of two, new soft red varieties and one hard red winter wheat variety will be available for the first time this year. The soft varieties are Timwin (developed at the University of Wisconsin) and Arthur (from Purdue University). The hard wheat variety is Parker, which was developed at Kansas State University.

There is also an import from the Southeastern United States, named Blueboy. Blueboy was grown commercially in the state in 1969, and was entered in the University of Illinois variety trials and the county Extension demonstration plots for the first time.

Timwin is a very winter-hardy, short, stiff-strawed variety that matures 3 to 5 days later than Monon and Benhur. It has good tolerance to the rusts, but is susceptible to loose smut and Hessian fly. The weight per bushel is usually 3 or 4 pounds below that of Monon and Benhur.

Arthur has a good performance record in Illinois. It is a short, stiff-strawed variety comparable to Monon that matures 1 to 2 days later than Benhur. Arthur is susceptible to one race of Hessian fly, but has good tolerance to stem rust, loose smut, soil-borne mosaic, and powdery mildew.

Blueboy is a short, stiff-strawed variety developed at North Carolina State University. It matures 7 to 8 days later than Monon and Benhur, weighs 3 to 4 pounds less per bushel than they do, and is susceptible to the rusts and Hessian fly. Blueboy is apparently more winter-hardy than most varieties developed for the Southeastern United States. However, its winterhardiness under Illinois conditions is still to be determined, because the 1968-1969 winter was relatively mild. All wheat varieties overwintered in good condition.

The variety had an outstanding yield record in 1969. In addition, it has good straw strength. The unanswered questions under Illinois conditions are: (1) that of winterhardiness; (2) whether the combination of lateness of maturity and disease susceptibility may lead to serious losses in some years; and (3) whether farmers, elevators, and millers will accept the lighter weight per bushel.

Parker, the new hard red variety, shows promise for Illinois. It is shorter and earlier in maturity than Gage and Pawnee and superior to those varieties in straw

strength. Parker is more resistant to lodging than any other hard wheat now being grown in Illinois. It has good tolerance to leaf rust, but is susceptible to stem rust and loose smut. Its reaction to soil-borne mosaic is about like Pawnee. It is at least comparable, if not better in performance, than other hard wheat currently being grown in Illinois.

*Yield Record of Leading Varieties in Agronomy Department
Tests and County Demonstrations*

	Brownstown (bu./A.)		Urbana (bu./A.)		DeKalb (bu./A.)		Average of 16 locations ^{a/}	
	1969	1968-69	1969	1968-69	1969	1968-69	Yield	Test weight
SOFT WHEAT								
Arthur.....	60	54	70	65	72	62	54	57
Benhur.....	56	50	70	63	64	56	50	57
Blueboy.....	74		81		68		62	55
Knox 62.....	54	50	61	57	63	55	48	57
Monon.....	51	49	66	62	68	62	47	56
Riley 67.....	50	48	62	60	68	56	50	56
Stadler.....	54	51	66	64	69	62	49	56
Timwin.....	51	49	77		72	66	48	55
Vermilion.....	57	52	64	62	72	63		

HARD WHEAT

Gage.....	41	43	61	56	62	52	48	56
Guide.....	47	46	66	55	63	53	47	57
Ottawa.....			59	50			45	56
Parker.....	50	48	64	60	65	58	50	58
Pawnee.....	44	44	58	50	54	51	44	56
Scout 66.....	47	45	67	58	59	51	50	56
Triumph.....	49	48	62	49	55	43	48	56

^{a/} Includes fourteen county demonstrations.

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AGRONOMY NEWS

crops and soils

September 30, 1969

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SELECTION OF NEXT YEAR'S SEED CORN

This fall is a good time to make evaluations of the hybrids you may choose for 1970. Look over the test plots that dot roadsides throughout the state. Many corn companies have prepared exhibits of their popular hybrids. Look for ear size, plant population, barren plants, row width, kernel fill, kernel depth and size, maturity, standability, root development, and evidence of disease on the leaves and in the stalks.

A large ear size may also be associated with low plant population. Barren plants and poorly filled ears may indicate that the population is too high for the hybrid, or that other stress factors were involved such as insects, drought, disease, or nutrient deficiency. Be fair in your evaluations. No two fields are just alike. Consider as much as you know about the weather conditions for the area and the soil type and fertility.

The yield results of greatest value are those from trials where several hybrids of different companies are compared under as near-equal conditions as possible. Very few corn companies do this. Many farmers do some testing of this type.

The usual farm test field involves several rows of each hybrid being compared. The real danger in such field tests is changing soil conditions, because the area of the test gets larger and larger as the number of hybrids increases. An acre block of each hybrid being tested is likely to be less accurate than a two- or four-row strip across the field.

The University of Illinois conducts a corn hybrid testing program for companies wishing to pay \$30 per entry. These tests place each hybrid in four areas located at random in one test site. Each hybrid is evaluated on the average of the four locations, considering the amount of variation in yield between each location at the test site and the average yield of other hybrids.

This test is completely unbiased and is the most accurate indicator of the relative yield differences among the hybrids tested. Not all hybrids being marketed in Illinois are included in these tests, at the option of the company. Hybrids not evaluated by the University tests or your own farm test should be considered on the reputation of the company, the dealer, and what you can observe at the company's field demonstration plots.

Note: Be sure to compare hybrid yields on the same moisture-equivalent basis.

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AGRONOMY NEWS

crops and soils

February 26, 1970

No. 399

ALFALFA IN THE SPRING

When the snow melts away from alfalfa fields, the plants are exposed to the most-rigorous time in their lives. Excess water, flooding, a low oxygen supply for the roots, freezing at night and thawing during the day are some of the greatest problems. But, there are ways to help alfalfa plants survive the attacks of disease, drowning, and weeds.

SURFACE DRAINAGE

First in importance is surface drainage. Plant damage and loss because of heaving and thawing will increase as the soil moisture increases. Therefore, providing drainage channels to move accumulated water off the field is essential. Severe plant loss because of heaving injury has been noted where water stands for a week or more. Extended periods of flooding, even in the early spring when little or no growth is visible, will weaken the plants, reduce the vigor of the roots, and result in extensive heaving.

A mulch of the late-fall growth or straw or strawy manure will also help reduce heaving. Alfalfa fields that are prone to heaving, were cut late in the fall, and did not accumulate much topgrowth, should have 1 to 1-1/2 tons of straw equivalent spread over them. Choose a day when the ground is frozen. This will reduce damage to the plant crowns.

Wheel traffic causes extensive plant-crown damage, especially when the soil is soft. Land that is nearly level, high in silt and clay, and with poor internal drainage is most likely to have heaving damage to the alfalfa.

Pure stands of alfalfa are subject to heaving damage more often than alfalfa in grass mixtures. The fibrous root system of the grasses reduces the heaving action of the soil, but may not eliminate damage.

Alfalfa partially heaved out of the soil should not be rolled with a roller. Trying to press the alfalfa plants back into the soil will cause greater injury than leaving the roots exposed. Such plants may settle back into the soil some by the time of the first harvest.

The crowns are usually raised well above the surface. In such cases, special care is needed at harvest time to prevent cutting off or through the crown. Cutting below the crown can kill the plant. Cutting through the crown will open wounds through which diseases can invade the plant. Such cutting can also remove the reproductive tissue, giving rise to or supporting the production of new shoots.

WHEN AND HOW TO FERTILIZE

Fertilize alfalfa in the early spring or after the first harvest. The most-efficient use of fertilizer has been obtained by applying it in early spring. The difference between early spring and after the first cutting is small. The amount to apply varies with soil's fertility status, its nutrient-supplying capacity, and the yields that can realistically be expected. If the general fertility status of the soil is medium to high (soil-test levels), maintenance rates can be estimated--providing that the nutrient-supplying capacity of the soil is known. Maps indicating this capacity of Illinois soils for phosphorus and potassium are available in the Cooperative Extension Circular 1012, *Illinois Agronomy Handbook 1970*. Soils that are high in phosphorus- or potassium-supplying capacity should receive about 50 percent of the removal of these nutrients. Soils that have a low capacity for supplying phosphorus or potassium should receive about 100 percent of the removal of these nutrients. For estimating purposes, a ton of dry hay (alfalfa or alfalfa-grass) contains about 11 pounds of P₂O₅ (phosphate) and 50 pounds of K₂O (potash).

WEED CONTROL

Weed control in established alfalfa is usually not a problem. In southern Illinois, some chickweed and henbit problems develop in the early spring and at first-harvest time. Simazine (Princep) is approved for application during the dormant period of alfalfa for controlling these weeds. Some yield reduction is likely when Simazine is used. Read the label directions and clearance requirements before application. If weeds are a major problem in an alfalfa field, this may indicate that it is time to plow up the alfalfa and establish another field somewhere else.

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AGRONOMY NEWS

crops and soils

February 24, 1970

No. 400

1970 Oat Varieties

Garland was the most popular variety last year. Most other varieties are declining in use, except for Jaycee. Brave, Goodfield, Clintford, Newton, and Tyler represent older and fairly recent varieties that perform well, occasionally exceptionally well, at various locations in the state. The newer varieties are Jaycee, Holden, Portal, Orbit, and Pettis.

Jaycee is one of the varieties that matures the earliest. It has yielded very well throughout the oat-growing region. It is very short and stands well until it is mature, but loses straw strength after becoming ripe. Jaycee has a high level of resistance to barley yellow dwarf virus (BYDV) and some resistance to many rusts and smuts.

Pettis is an early maturing variety with excellent tolerance to BYDV. It is a short-strawed variety, but lacks straw strength under high-fertility conditions.

Newton is an early variety with good straw strength and some tolerance to BYDV. It is susceptible to prevalent races of rust.

Brave is an early variety that has excellent smut resistance and some tolerance to BYDV. Brave's straw strength is inferior to that of Newton.

Clintford matures relatively early and has a short, stiff straw. It is resistant to most races of smut and has some tolerance to BYDV. Clintford should respond to high fertility.

Garland is an oat that matures at midseason. It is well suited to northern and central Illinois. Garland has good straw strength, some resistance to smut, and a good yield record.

Holden is a mid- to full-season variety that matures slightly later than Garland. It has yielded a little more than Garland in central and northern Illinois. Holden's disease resistance is better than that of Garland.

Portal is a mid- to full-season variety, maturing slightly later than Garland. Portal has yielded more than Garland, but has a taller and weaker straw and a lower test weight.

Orbit matures at midseason. It has a white kernel. Orbit is short-strawed and will resist lodging. A thick hull on Orbit lowers the groat-to-hull percentage.

University of Illinois Oat Variety Yields (Bu./A.)

Variety	DeKalb		Urbana		Brownstown	
	1969	1968-69	1969	1968-69	1969	1968-69
Brave.	72	94	66	88	66	88
Clintford.	71	94	53	75	49	68
Clintford 64	66	92	51	77	54	...
Garland.	78	101	62	80	52	71
Holden	77	102	60	87	53	76
Jaycee	84	106	81	95	60	84
Newton	70	98	69	87	54	76
Orbit.	76	104	65	92	64	83
Pettis	77	102	77	...	63	...
Portal	80	103	50	77	44	72
Tyler.	67	97	63	82	48	69

1969 County Oat-Variety Demonstration Yields (Bu./A.)

County	Clint-										Ty le
	Brave	Clint- ford	Clint- ford 64	Gar- land	Holden	Jaycee	Newton	Orbit	Pettis	Portal	
Boone.	76	83	85	80	80	83	56	87	83	87	8
Bureau	45	70	65	75	67	60	...	68	...	60	8
Ford	38	32	18	28	21	54	31	37	27	21	3
Henderson.	...	77	92	85	85	96	59	79	67	82	9
JoDaviess.	92	89	107	89	101	77	81	82	93	106	9
Knox	86	82	73	79	83	95	76	81	88	81	8
Lake	116	79	65	68	73	72	86	74	95	79	8
Mercer	52	100	86	74	81	106	67	64	79	72	9
Stark.	72	91	78	73	73	98	78	92	...	79	9
Stephenson	61	75	59	63	62	63	71	57	69	59	5
Warren	90	113	95	95	79	113	122	85	100	62	8
Winnebago.	57	73	80	66	60	66	60	69	42	69	6
Average ^{a/}	71	80	75	73	72	83	71	73	74	71	7

^{a/} Comparable among only the varieties grown at *all* locations.

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AGRONOMY NEWS

crops and soils

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This index to current *Agronomy News* issues can serve as a handy guide to make your personal set a more-useful reference. If you would like any of these back issues, send us a card with the numbers and titles, and we will send them to you.

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No. 402

March 15, 1970

Weed Control for Changing Tillage Practices

Dynamic changes in tillage methods are taking place in Illinois. Some growers are switching to the chisel plow. Others are reducing seedbed preparation and row cultivation. And herbicides are being used to replace some tillage operations. Research makes clear the potential for sod-planting and double-cropping.

Within these changes are new weed problems and challenges. Some answers are already worked out. Others are not so simple. We have a number of herbicides and cultural practices from which to choose. By carefully analyzing the problem, solutions can usually be found. But success hinges on adequate foresight and planning, and on careful management.

MINIMUM TILLAGE

Many northern-Illinois corn growers still fall-plow and minimize tillage by field cultivating or disking only once before planting. Supplementing such tillage with rotary hoeing, one- or two-row cultivations and perhaps some herbicides can usually provide good control of weeds. With such a program, most growers make few mistakes and end up with good weed control.

If you are just starting a minimized-tillage program, soybean stubble is a good place to begin. By leaving soybean stubble over the winter, you can reduce soil losses considerably. By using only a disc or field cultivator ahead of the planter on soybean stubble, you can often realize adequate control of any weeds present, while at the same time "opening up" the soil and thus allowing better herbicide performance.

PLANT RESIDUE

Soybean residue--small stems and leaves that decompose rather rapidly--do not interfere very much with herbicide performance. But corn stubble may give about twice as much residue as soybeans. Planting in the residue from a previous corn crop presents a much greater challenge.

Old stalks, leaves, and husks may intercept some herbicides and prevent them from getting into the soil. Residue, root clumps, and clods may prevent adequate mechanical incorporation of some herbicides. Clods can interfere with proper positioning of the herbicide. And when the clods containing weed seeds "melt down," the weeds may be "home free."

WEED AND PLANT SEEDS

Weed seeds left on or near the surface may not decompose as readily or remain dormant, as those plowed under will do. Residue on the surface can keep the shallow soil surface more moist and enhance the germination of weed seeds. Reducing seedbed preparation and row cultivation may also create a greater problem with some perennial weeds.

Fall panicum is one of the most-severe, annual grass problems that accompanies minimized tillage. This seems to be especially true where there is a history of atrazine use, where corn plant populations are not adequate to provide plenty of shade, and where early planting results in shorter corn plants and less shade.

We can hardly advocate later planting just to get taller corn and more shade. Because of some of the benefits of minimized tillage, we should be optimistic and accept the challenges for improving weed control.

Despite some residue left on the surface, adequate chisel plowing may prepare the seedbed enough to allow sufficient incorporation of some herbicides. Or, a surface-applied herbicide can be quite adequate.

HERBICIDE APPLICATIONS

1969 research suggests that surface-applied Lasso should be helpful for controlling panicum. Sutan also looks quite promising for panicum control if adequately incorporated. Simazine may also provide better panicum control than atrazine, although present research is not conclusive.

Directed postemergence applications could help, and some treatments might be timed for post-emergence application to corn but for preemergence application to late-germinating panicum.

Atrazine applied preplant, preemergence, or very early postemergence should control most broadleaved weeds, and perhaps early germinating grasses as well. Ramrod plus atrazine might be adequate where panicum problems have not developed.

The Lasso plus atrazine combination may have a future potential. And even though you minimize seedbed preparation, do not neglect help from row cultivation wherever feasible. If broadleaves do develop, 2,4-D often provides an economical answer.

For "sod planting," select a treatment designed for the specific type of vegetation to be controlled. On fescue sod in southern Illinois, Paraquat plus atrazine will control the fescue and provide residual control of annual weeds.

Paraquat, primarily for killing existing plants on contact, should help control perennial grasses like fescue. Where legumes such as alfalfa or clover are present, a translocated herbicide like Banvel or 2,4-D has a better chance of moving down into the roots for a more-nearly complete kill. If used, Banvel should be applied early, before the soybeans or other sensitive plants in the vicinity are growing.

Double-cropping with soybeans planted in wheat stubble shortly after the wheat harvest appears to have a considerable potential in the southern part of the state. During dry years, the soybean crop may yield 15 or 20 bushels or more with little additional investment.

To control vegetation in wheat stubble without tillage, Lorox plus Surfactant WK may provide control of both existing broadleaves and grasses plus a residual response for preemergence weed control.

If you are minimizing tillage and depending on herbicides for considerable help, develop a good understanding of what to expect from each herbicide. Carefully select the herbicides best adapted for each specific situation. Be on your toes, in order to anticipate or recognize weed problems early and make timely applications.

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AGRONOMY NEWS

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March 20, 1970

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Herbicides for Control of Weeds in Soybeans

Soybean growers can choose from more than a dozen herbicide treatments designed to eliminate weed problems. Each treatment has strong and weak points. Most give good control of annual grasses, but few give acceptable, across-the-board control of broadleaved weeds. Some of these treatments must be applied at a specific time during the planting and early growing season. Others work best on specific soil types.

To aid you in selecting the treatment that will do the best job on your farm, here's a run-down of the standard treatments to consider:

Treflan (trifluralin) can be applied anytime within ten weeks before planting. But the treatment should be thoroughly incorporated into the top 2 to 3 inches of soil soon after application. Treflan is one of the most-effective and consistent herbicides for controlling annual grasses and Johnsongrass. It also gives some control of morningglory, and it is one of the best choices for controlling wild cane seedlings.

Planavin (nitralin) can be applied during the six weeks before planting, and incorporation may be delayed as much as 48 hours. This treatment best suits soils with no more than 3 percent of organic matter.

Vernam (vernolate) can be applied preplant or preemergence. Incorporation improves control, but it may cause somewhat greater soybean injury. Granule treatments need not be incorporated, but liquid applications should be incorporated immediately. Vernam is one of the best choices for the control of yellow nutsedge. If incorporated, it gives some control of annual morningglory.

Lasso (alachlor) is usually applied preemergence, but preplant incorporation will improve the control of yellow nutsedge.

Amiben, applied as a preemergence herbicide, provides a broad spectrum of control, including velvetleaf. But Amiben does not control morningglory, and gives only fair control of smartweed. It is best adapted to soils of medium to high organic-matter content.

Lorox (linuron) performs best on soils containing 1 to 4 percent of organic matter. Use about 1 pound of Lorox 50W per acre for each percent of organic matter in the soil. Lorox effectively controls many broadleaved weeds--including velvetleaf, but does not control morningglory.

Chloro-IPC (chloropropham) is one of the most-effective choices for the control of smartweed. It can be applied over some preplant herbicides or along with some preemergence ones to improve smartweed control.

Solo, Alanap Plus, and Whistle are combinations of Chloro-IPC and Alana. Solo is a 1-to-1 ratio; the other two are 2-to-3 ratios. All three do a fair job of controlling many broadleaved weeds--including velvetleaf, jimsonweed, and cocklebur. The combinations are available in both liquid and granular form.

Randex (CDAA) has been a popular grass herbicide, but is being replaced by Ramrod and Lasso. Ramrod (propachlor) and Londax (linuron-propachlor) are cleared for use on "seed beans," but not for soybeans sold for food, feed, and oil purposes.

Preforan (L-6989) is also cleared only for "seed beans" at present. Dacthal (DCPA) and diphenamid (Dymid and Enide) are grass-control herbicides cleared for soybeans, but used primarily on vegetable crops.

Several new herbicide combinations for soybeans may become available. Some of the new introductions are combinations of a grass-control herbicide and Lorox (linuron) for broadleaved weed control. New combinations include: Shamrox (Dacthal-Lorox), Amilon (Amiben-Lorox), Lasso plus Lorox, and Noraben (Amiben plus Norea). Norea is closely related to Lorox.

Postemergence treatments have never been popular for soybeans in Illinois. But three herbicides are available for postemergence use.

Butyrac 175 and **Butoxone SB** (2,4-DB) can be applied from 10 days before bloom to midbloom. They control cocklebur, morningglory, and ragweed, but frequently injure soybeans. A directed treatment will reduce this injury.

Tenoran (chloroxuron) will control several emerged, broadleaved weeds if applied before they are 1 to 2 inches tall. The addition of a surfactant (Adjuvan-T) greatly enhances activity.

Premerge or **Sinox** (dinitro or dinoseb) are contact herbicides. They are presently cleared for use until the first "true leaf" of soybeans, and have a directed clearance for "seed beans."

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NA, ILLINOIS

AGRONOMY NEWS

crops and soils

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JUN 22 1970

April 8, 1970

1969 Soybean Variety Tests

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

No. 404

The 1969 season produced a record state average-yield estimate by the Illinois Cooperative Crop Reporting Service of 33.5 bushels per acre. Soybean yields are pushing upward. The state average yield for the first five years of this decade (1960-1964) was 27.5 bushels per acre. During the second five years, the average was 30.5 bushels. In addition, there has been a steady increase in the number of acres harvested. Illinois farmers were harvesting about 5 million acres of soybeans in 1960. By 1969, this figure was 6.6 million acres.

Many factors are contributing to higher yields. These include better weed control, greater use of narrow rows, higher soil fertility, and better varieties. The seed for three new varieties was commercially available for the first time in 1970. These were Beeson, Calland, and Cutler.

Beeson matures 3 days later than Amsoy. Beeson is resistant to Phytophthora rot, and has a greater resistance to lodging than Amsoy or Corsoy.

Calland matures 1 to 2 days later than Wayne, and is resistant to Phytophthora rot. Calland is also slightly more resistant to lodging than Wayne.

Cutler is 2 to 3 days later than Clark 63, is susceptible to Phytophthora rot, but is more resistant to lodging. Table 1 shows the performance of these three new varieties in comparison with several others.

County Extension Advisers established 59 soybean variety demonstrations. Since these demonstrations were located throughout the state the varieties included varied from North to South. At the bottom of Table 2 are average yields for certain varieties that were included in the same demonstration locations.

Table 1. Summary of U.S. Regional Soybean Laboratory Variety Trials during 1967-1969, at Eight Locations

Maturity group and variety	DeKalb	Pontiac	Urbana	Girard	Edge-wood	Trenton	Eldorado	Miller City
Chippewa 64.	43.5	39.8	42.8	...	...	...	...	...
Hark	48.2	42.6	48.6	...	...	...	...	...
Corsoy	54.8	45.4	53.3	51.8	41.5	51.3	48.2	...
Amsoy.	50.0	43.1	50.3	51.3	41.4	50.4	49.1	...
Beeson	49.4	42.3	48.0	46.1	43.9	48.4	50.5	...
Wayne.	49.2	42.4	49.3	50.0	44.7	50.5	51.6	...
Calland.	...	...	48.0	48.4	45.9	48.7	48.8	...
Clark 63	...	...	41.7	40.4	41.4	46.9	47.3	35.7
Cutler	...	...	45.3	46.2	41.8	51.2	48.5	37.3
Kent	...	...	44.3	43.3	45.5	50.5	47.8	34.9
Custer	...	...	...	...	...	39.4	44.2	40.8
Delmar	...	...	...	...	...	43.7	46.3	37.3
Hill	...	...	...	...	...	...	...	37.2 ^{a/}
York	...	...	...	...	...	...	...	43.3 ^{a/}
Dare	...	...	...	...	...	...	...	39.0 ^{a/}

^{a/} Estimate based on two years of data.

Table 2. County Soybean Demonstrations in Illinois, 1969, by Variety

County	Chippewa	Hark	Chippewa + Hark	A-100	Harosoy 63	Corsoy	Corsoy + Harosoy	Ansoy	Beeson	Wayne	Calland	Adelphia	Clark 63	Outler	Clark 63 + Outler	Bellatti L-263	Ouster	Kent	Dare
Bureau	35.9	41.1	40.7	49.1	40.1	40.3	46.3	49.0	50.2	47.5	...	...	...	...	...	...	...	...	...
Clark	...	...	...	...	...	50.4	...	47.4	49.3	46.3	48.9	44.3	51.2	48.1	47.2	58.3	...	...	...
Douglas	...	...	...	...	...	34.7	...	34.0	30.5	37.4	33.9	33.9	...	33.1	27.0	34.7	...	...	...
DuPage	26.4	28.9	29.3	...	27.8	33.8	...	38.9	31.8	...	...	...	...	...	...	...	...	...	...
Franklin	...	...	...	...	...	...	...	...	...	25.0	...	22.0	24.0	27.0	27.0	...	27.0	24.0	...
Fulton	...	28.0	...	...	29.5	25.9	27.2	34.9	35.7	37.0	...	...	...	...	...	...	...	...	...
Gallatin	...	...	...	...	...	...	...	...	...	43.6	...	34.5	40.2	44.4	41.8	...	34.8	42.2	48.0
Grundy	...	43.4	...	...	45.9	53.4	49.3	47.8	46.4	49.8	...	...	...	...	...	...	...	...	...
Iroquois	...	51.5	...	...	49.9	53.1	50.6	50.0	50.6	52.1	...	...	...	...	...	...	...	...	...
Jefferson	...	...	...	...	...	...	...	...	...	20.0	...	10.9	20.2	20.6	19.7	...	20.8	16.6	19.7
Jersey	...	...	...	...	...	37.1	...	34.4	33.9	48.0	46.2	39.8	43.8	48.7	46.1	47.8	...	...	...
Kankakee	...	33.2	...	...	34.5	39.1	38.2	38.7	37.4	41.5	...	...	...	...	...	...	...	...	...
Lake	22.9	24.0	22.9	23.0	25.8	25.8	...	24.2	26.8	...	...	...	...	...	...	...	...	...	...
LaSalle	38.8 ^b	41.8	41.9 ^b	45.6 ^b	40.9	45.3	41.6 ^b	45.1	45.4	42.3 ^b	...	...	...	...	...	...	...	...	...
Livingston	...	42.8	...	...	43.8	46.3	45.9	43.5	46.8	46.6	...	...	...	...	...	...	...	...	...
McLean	...	43.6 ^b	...	...	41.1	44.8	43.7 ^b	46.2	48.3	46.2	...	...	...	...	...	...	...	...	...
Macon	...	59.3	...	...	60.5	59.0	59.8	62.0	58.6	58.6	55.7	55.7	55.9	58.6	59.3	60.1	...	...	...
Macoupin	...	...	...	...	...	31.4	...	31.6	35.7	38.9	40.0	33.2	37.3	41.9	34.2	34.9	...	...	...
Madison	...	...	...	...	...	48.3	...	45.6	39.4	49.4	46.9	42.7	44.6	46.5	43.1	...	...	...	...
Marshall-Putnam	...	48.2	...	...	46.9	54.8	51.9	53.3	57.5	58.7	...	...	...	...	...	...	...	...	...
Monroe	...	...	...	...	36.1	42.0	...	40.6	27.3	35.1	33.5	33.5	29.1	31.8	36.8	36.1	...	...	...
Montgomery	...	...	...	...	...	31.6	...	32.1	36.1	38.9	40.1	33.5	37.1	42.3	34.4	34.9	...	...	...
Morgan	...	...	...	...	...	45.7	...	51.2	50.3	47.9	47.5	45.7	42.9	47.9	44.6	40.3	...	...	...
Ogle	34.8	38.2	37.6	37.0	37.6	44.7	...	41.2	41.3	...	...	...	...	...	...	...	...	...	...
Peoria	...	41.4	...	...	44.3	45.8	44.5	52.3	50.3	48.8	...	...	...	...	...	...	...	...	...
Sangamon	...	...	...	...	...	33.5	...	43.5	35.6	41.6	43.1	39.2	44.7	44.7	35.9	42.5	...	...	...
Schuyler	...	44.7	...	...	45.1	42.8	...	51.3	48.8	45.2	47.6	...	...	...	...	...	...	...	...
Shelby	...	...	...	...	...	38.4	...	35.0	40.2	47.2	45.6	47.7	40.4	...	...	...	...	...	...
Stark	...	43.3	...	...	44.3	54.4	55.5	51.9	57.7	53.7	...	...	...	...	...	...	...	...	...
Tazewell	...	21.3	...	...	24.8	23.5	23.3	28.2	26.5	31.6	...	...	...	...	...	...	...	...	...
Wabash	...	...	...	...	...	...	...	...	...	35.8	36.7	39.2	34.9	37.5	37.1	...	33.1	29.0	...
Warren	...	38.0	...	...	40.1	41.3	40.1	40.8	41.2	44.7	...	...	...	...	...	...	...	...	...
White	...	...	...	...	...	...	...	...	...	36.2	...	27.6	36.1	37.7	36.9	...	38.5	35.3	...
Woodford	...	45.1	...	...	46.5	51.9	48.8	50.9	53.9	49.7	...	...	...	...	...	...	...	...	...
Brownstown Exp. Field	...	...	...	...	...	36.0	...	38.0	36.0	38.0	37.0	34.0	...	38.0	37.0	31.0	...	...	...
Newton Exp. Field	...	...	...	...	...	38.0	...	38.0	35.0	44.0	39.0	39.0	...	41.0	42.0	...	...	...	...
Raleigh Exp. Field	...	...	...	...	...	...	...	...	...	27.9	...	24.5	...	32.5	31.5	...	29.5	33.8	32.6
Toledo Exp. Field	...	...	...	...	...	49.0	...	48.0	39.0	50.0	53.0	43.0	...	54.0	51.0	...	...	...	...
Avg. of same 30 locations	...	41.0	...	...	40.9	44.6	...	45.0	45.7	...	...	...	...	...	...	...	...	...	...
Avg. of same 12 locations	...	...	...	...	...	...	...	...	...	44.7	44.3	41.0	43.2	45.4	...	...	...	...	...
Avg. of same 10 locations	...	...	...	...	...	...	...	...	...	...	...	...	42.9	46.1	...	44.3	...	...	...

^aAverage of more than one location in county. ^bNot included in all locations in county.

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ANA, ILLINOIS

AGRONOMY NEWS

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April 16, 1970

APR 16 1970

No. 405

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Weed Control for Corn

You now have several good alternatives for controlling weeds in your corn--a healthy situation. If you prefer to apply the herbicide before planting, consider AAtrex, Sutan, or the Sutan-atrazine combination. We are particularly interested in the Sutan-atrazine combination, especially on relatively dark soils with more than 3-percent organic matter. On such soils the Sutan-atrazine combination often gives better grass control than AAtrex alone; also, better broadleaf control than Sutan alone.

Corn tolerance with Sutan does not seem to be a serious problem. But applications must be made uniformly and accurately, especially when Sutan is applied with liquid fertilizer.

For the relatively light soils containing less than 3-percent organic matter, AAtrex as a preplant or preemergence treatment at planting time has been giving good results.

If you're following a reduced-tillage system and weeds like fall panicum and crabgrass are a problem, consider using a good grass killer such as Lasso or Sutan--even on relatively light soils. Princep also appears promising for panicum control.

If you prefer to apply herbicides at planting time or shortly after, there are several choices. For the relatively dark soils with more than 3-percent organic matter, Ramrod-atrazine generally gives very good weed control. This combination is more consistent and gives a broader spectrum of weed control under a wider range of soil and weather conditions than either material alone.

Ramrod granules have given good control on relatively dark soils. Applied in a band, the granules are used primarily for controlling annual grasses like foxtail. You may need to follow with an early postemergence application of 2,4-d for broadleaf control. There is some risk of corn injury from the 2,4-d, but it has long been one of the most-effective and economical controls for broadleaved weeds in corn.

Lasso is similar to Ramrod in many respects. Both are cleared for preemergence use on corn. Lasso is also now cleared for use as a pre-plant incorporated treatment which should be helpful for control of nutsedge. On light silt loams containing less than 3-percent organic matter, Lasso appears better adapted than Ramrod.

On relatively dark soil, there seems to be no big advantage in switching from Ramrod to Lasso. And occasionally Ramrod may even perform slightly better than Lasso.

Both Lasso and Ramrod are available in granular form. Ramrod is also available as wettable powder and Lasso as a liquid. Lasso is less irritating than Ramrod.

On the light-colored silt loams with less than 3-percent organic matter, a preemergence application of AAtrex preplant, at planting, or soon after continues to be an exceptionally good weed-control treatment. Sometimes, AAtrex alone is satisfactory on the darker soils, depending on the organic matter content and the specific weed problem.

Each year, combinations get more popular for weed control in corn. Londax, a combination of Lorox plus Ramrod, gives relatively good control of both broadleaved and grass weeds. Because of the Lorox in the combination, however, there is some possibility of corn injury unless applications are made accurately and uniformly and unless rates are selected carefully on the basis of soils to be treated. Londax is available as a wettable powder for spraying, or as granules.

Knoxweed will continue to be available. Knoxweed is not quite as consistent as some other materials, and it injures corn occasionally. Even so, it does have the advantage of being available in granular as well as liquid form for spraying.

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No. 406

Hay-Making Time

Most first-cutting alfalfa should be harvested in mid- to late May. The higher-yielding alfalfa varieties being used in many of the new plantings mature earlier than those of 10 to 15 years ago. Earlier harvesting is required if the extra yield potential of the newer varieties is to be realized.

Plant maturity is a very practical indicator of the time to harvest. For top yields of high-quality hay, harvest the first cutting of alfalfa in the late-flower-bud to first-bloom stage. As soon as any flowering is seen in a field, it is time to harvest the first crop.

Harvesting in the late-bud to first-bloom stage means harvesting about May 15 in southern Illinois, May 25 in the central part of the state, and June 1 in northern Illinois. Early harvesting usually involves rainfall problems. Soil moisture is generally good at early harvesting times, and will stimulate rapid recovery growth. Taking the first harvest early while soil moisture is high increases the yield potential for the second growth.

Hay fields with very much orchardgrass will also need to be harvested early in May. Orchardgrass matures early, although certain varieties differ in their flowering dates by 10 to 14 days. Most of the orchardgrass used in Illinois hay fields will flower with or slightly ahead of the earliest alfalfa variety.

A recent report from the University of Tennessee indicates that orchardgrass should be harvested in the early joint, late-boot, or past-bloom stage for maintenance of good stands. For quality of feed, the early joint to late-boot stage is preferred. The harvest date of orchardgrass can be judged by the sign of the first head, or by closely examining the plant earlier--cutting open the whorl of the leaves in order to determine the location of the seed head. When the seed head is clearly evident in the stem or is nearing the point of breaking out of the whorl, it is time to harvest.

Near or equal yields have been produced by harvesting at the early joint stage when the seed head is near the base of the elongating stem--versus harvesting at the late-boot to early bloom stage. Summer production was greater when the first cutting was made at the early joint stage, rather than at the late-boot or flowering stage. Fields that are to be used for summer pasture may benefit from harvesting the first cutting of orchardgrass at the early joint stage.

Smooth brome grass and timothy are often included with alfalfa in central and northern Illinois. Smooth brome grass flowers about the same time as the later-maturing alfalfa varieties. The time to harvest alfalfa-smooth brome mixtures is when the alfalfa is ready--late-bud to

first-flower stage. If brome grass is the primary species in the field, harvesting should be done at the early heading stage, but before the new tillers from the base of the plant are tall enough so that the growing point enclosed in each tiller will be removed by the harvest operations. In general, new tiller growth should not exceed 3 to 5 inches at harvest time.

Timothy usually matures later than alfalfa, and should be harvested when the alfalfa is ready, when alfalfa-timothy mixtures are grown. Fields that are mostly in timothy should be harvested at the late-boot to first-heading stage.

If wet weather interferes with hay-making, try the wilted-silage method. Wilt legume-grass hay crops to about 65-percent moisture, chop fine, and store in a good silo. If a bunker silo is the only storage facility available, do not wilt the hay crop; chop it fine and pack it tightly.

To determine the moisture content of forage crops on the farm, ask your Extension adviser for publication AG-1962.

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AGRONOMY NEWS

crops and soils

May 20, 1970

No. 407

Marihuana—on Your Farm?

Marihuana, or wild hemp, is now classified as a noxious weed in Illinois. This means it is unlawful to have it growing on your farm. Not only is marihuana considered a menace to our society, especially for some of our young folks, it is also considered poisonous to livestock. So learn to recognize it and get rid of it. You will be doing yourself and society a favor.

IDENTIFICATION

This plant is an annual that grows only from seed each year. The seed germinates rather easily, beginning about May in Illinois. New plants may also start from seed germinating later in the season.

Although marihuana is well adapted to fertile soils, it is not usually found in cultivated crops such as corn and soybeans. Watch for it along fences, railroads, roadsides, ditchbanks, and other noncrop areas.

Each leaf on the marihuana plant is made up of an odd number of leaflets--5, 7, 9, or 11, but commonly 7. The leaflets have a palmate arrangement. The leaflets join together at the base, somewhat like the fingers on your hand. Each leaflet is long and narrow, with notched or sawtoothed edges.

The stems are somewhat grooved, with branched coming out just above the leaves. Crowded plants may not have any lower branches. Widely spaced plants may be rather bushy. The plants can grow up to 10 feet or more high. They feel rather rough and coarse and are sometimes confused with giant ragweed (horseweed). But giant ragweed leaves have three main lobes and are not divided into the long narrow leaflets with notched edges.

Marihuana plants are of two kinds, male and female. The male plants have many, small, greenish-yellow flowers at the top. After producing pollen, the male plants turn yellow, wither, and die. The flowers of the female plants are not quite as conspicuous, but after pollination, the female plants become bushy, produce seed, and may remain green and vigorous until frost.

Marihuana was raised as a fiber crop in Illinois during World War II, but was present as a weed before that time. It may be found in many parts of Illinois, but is most prevalent in the northern two-thirds of the state.

ERADICATION

The laws against the sale or possession of marihuana are rather severe. Most farmers realize their moral obligation to control marihuana plants and to remove this temptation from our environment.

Control measures should be aimed at preventing seed production. Pulling and hoeing are effective for a few plants or for small patches. Mowing is effective if the area is accessible.

Cultivating the area and growing row crops or establishing a good, vigorous stand of desirable grasses or legumes can also discourage marihuana.

Spraying provides a simple, low-cost, and very effective means of control. For best results, spray in late May or June while the plants are relatively small--about 12 inches high or less. If new plants grow, repeat spraying as needed.

The most-economical spray is 2,4-D. It should be used when plants are small. Mixtures of 2,4-D and 2,4,5-T are sometimes used, especially if some undesirable brush is also present.

Using about 1 quart of 2,4-D with 50 gallons of water for each acre to be sprayed and thoroughly wetting the plants is usually adequate. For older plants, the amount of 2,4-D and water may be increased. But be certain to spray before marihuana produce seed.

If you are too busy with field work during June, consider hiring someone to do the spraying. Use appropriate precautions with 2,4-D and similar herbicides to prevent damage to nearby, desirable species.

By controlling marihuana on your farm, you will be improving the quality of our environment.

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URBANA, ILLINOIS

AGRONOMY NEWS

crops and soils

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AT URBANA-CHAMPAIGN

No. 408

Field Tours

University of Illinois at Urbana-Champaign
Agronomy Research Centers and Fields

SEE RESEARCH IN PROGRESS. HEAR DISCUSSIONS ON TOPICS OF
CURRENT INTEREST ABOUT CROPS AND SOILS.

Field	Date	Time (CDT)
Brownstown.	June 16	9:30 a.m.
DeKalb.	June 30	10:00 a.m.
Carbondale ^{1/}	July 30	1:00 p.m.
Aledo	August 10	1:00 p.m.
Dixon Springs	August 13	10:00 a.m.
Kewanee	August 31	2:00 p.m.
Carlinville	September 1	1:00 p.m.
Brownstown.	September 2	9:30 a.m.
Toledo.	September 3	1:00 p.m.
Hartsburg	September 4	1:00 p.m.
Dixon	September 8	1:00 p.m.
Carthage.	September 9	1:00 p.m.
Urbana.	September 10	7:00 a.m.
Elwood.	September 15	1:00 p.m.



^{1/} Sponsored jointly by University of Illinois
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□ Research Centers
● Research Fields

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L.V. Boone
Agronomist

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AT URBANA-CHAMPAIGN

AGRONOMY NEWS

crops and soils

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No. 409

Late-Summer Seeding of Alfalfa and Other Forages

Seedings made in August or early September will usually be as high yielding as seedings made the previous spring or even higher. The risk of failure is slightly greater for late-summer seedings than for spring seedings, but the chance of equal or higher yield offsets this risk.

August and early September seedings have good chances of success in all of Illinois except the northern two or three tiers of counties where only spring seedings are suggested. The southern quarter of the state may have greater success with early September seedings than with spring seedings.

Seedbed preparation will usually include plowing, disking, harrowing or dragging, and rolling. A firm seedbed is essential. Firm seedbeds hold moisture for a longer time than loose seedbeds. Seeding depth is easier to control on a firm seedbed.

Fertilization for the first year of production and any lime needed should be applied after plowing. Soil tests will help determine your needs.

Seedings made with a grain drill with a fertilizer attachment should have 20 to 50 pounds of P_2O_5 applied as a starter fertilizer. Little or no nitrogen is needed. Late-summer seedings made on soils with less than 1-1/2 to 2 percent of organic matter may benefit from 10 to 15 pounds of nitrogen per acre. Potassium is not needed in the starter fertilizer on most Illinois soils, but if it is used, 10 to 20 pounds of K_2O per acre is suggested. Potassium is very essential for production after establishment, so if large amounts are needed, they should be applied before or just after plowing.

Band seeding and broadcast seeding usually are equal except where soils are very low in phosphorus. The band-seeding method, which places a band of high-phosphate fertilizer directly below the seed, is a desirable method on soils testing low in phosphorus. Either method requires a firm seedbed and a firming of the seed into contact with the soil after the seed is distributed on the soil surface. Press wheels, often used with band seeding, are excellent for firming forage crop seeds into the soil surface. A corrugated roller does very well also. These methods of firming the seeds into contact with soil particles place the majority of seeds 1/4 to 1/2 inch deep if the seedbed was firmed prior to seeding. The small seeds of alfalfa, clovers, and perennial forage grasses prefer shallow seedings of 1/4 to 1/2 inch deep.

Preferred seeding dates in Illinois are:

North central--August 15-30
Central--August 25-September 10
South central--September 1-15
South--September 1-25

Earlier seedings than the above dates often result in poorer stands because the early germination may be followed by two or three weeks of hot, dry weather and the seedlings perish. July and August are the driest months of the growing season and are good for seedbed preparation, but the seeding should be delayed until the chance of frequent showers increases.

No companion crop or herbicide should be used with late-summer seedings. Weeds rarely give enough competition to be harmful to the stand of forages. Usually no clipping or grazing should be allowed during the fall or winter on these seedings.

Varieties for late-summer seeding should be the same as those for spring seeding with one exception. Varieties that have an early-fall dormancy growth habit may not become well enough established during a dry fall to survive the winter. If there is ample moisture at seeding time and prospects are good for continued adequate supplies of moisture, even early-fall dormancy varieties may be used.

Crops such as birdsfoot trefoil and crownvetch have slow seedling growth rates and should not be seeded in late summer unless seeded early in August during seasons of ample moisture. Spring seedings are less risky with these crops.

Don W. Graffis
Extension Agronomist

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AGRONOMY NEWS

crops and soils

No. 410

SHARE A DAY AT AGRONOMY DAY

AGRONOMY DAY, 1970

University of Illinois agronomists invite Illinois farmers and agribusinessmen to share a day with them on September 10 for Agronomy Day on the Agronomy South Farm in Urbana.

Here are the "Agronomic Research for the 70's" topics you'll see at Agronomy Day:

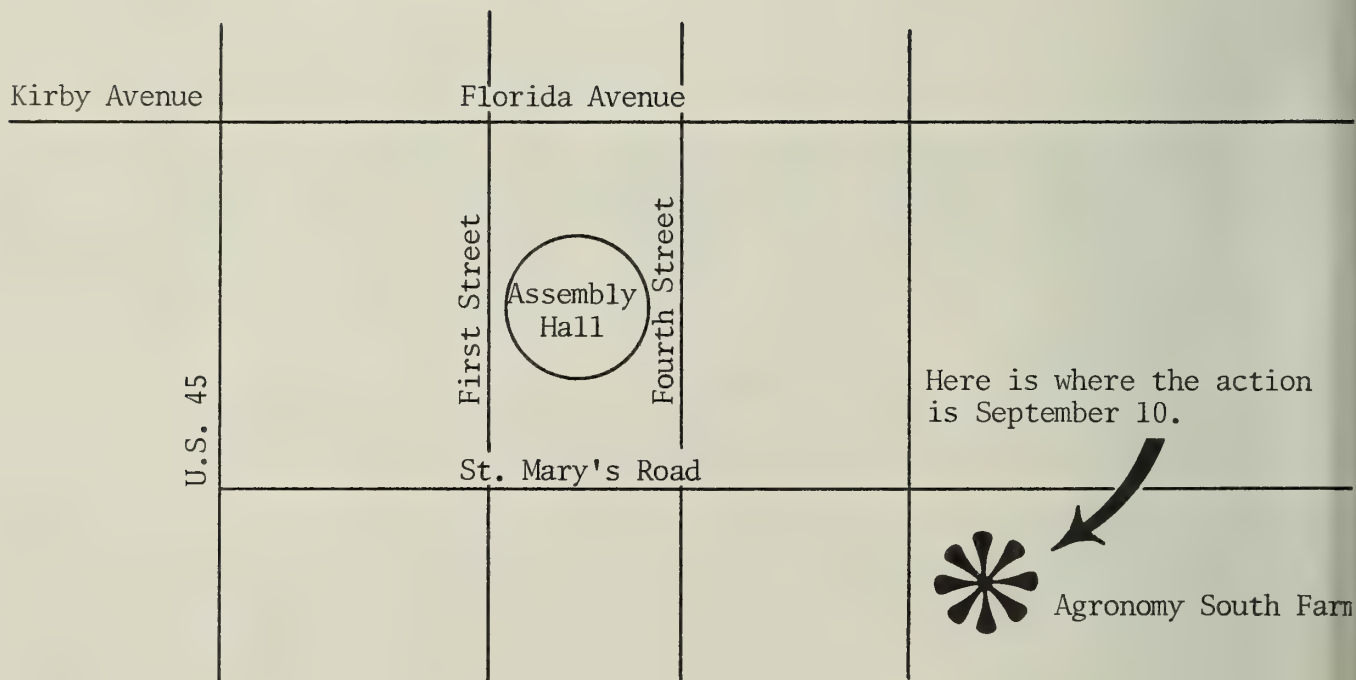
- Planting Date of Soybeans
- Composition of Municipal Waste
- Can Farmers Use Municipal Wastes?
- Foliar Application of Nitrogen and Phosphorus to Corn and Soybeans
- Report on Diseases--Corn, Soybeans, and Small Grains
- Plow, Chisel, or Zero Tillage
- Insect Problems of 1970
- Sulfur Status and Fertilization Needs of Illinois Soils
- Soybean Varieties
- Aerial-Seeded Corn
- Nitrogen for Optimum Yield and Minimum Pollution
- Maize Geometry
- Nitrate Accumulation Under Alfalfa and Corn, and With Three Tillage Systems
- Controlling Broadleaved Weeds in Soybeans
- Wild Hemp--Identification and Control
- Soybean Germplasm for Varieties in the 70's

Agronomy Day, 1970 tours begin at 7:00 a.m. and leave at 10-minute intervals until 1:00 p.m. Each tour lasts approximately 3 hours. Lunch, cold drinks, and ice cream will be available on the farm.

Flying farmers arriving at the University Airport should call 333-2965 for transportation information to the Agronomy South Farm.

In case of rain, talks will be presented in the Stock Pavilion on campus, located on Pennsylvania Avenue.

We hope to see you at Agronomy Day, September 10, 1970, on the Agronomy South Farm in Urbana.



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AGRONOMY NEWS

crops and soils

September 6, 1970

No. 411

The 1970 Wheat Crop

The Illinois Cooperative Crop Reporting Service estimates the 1970 state average yield of wheat at 38 bushels, which is slightly more than last year but 3 bushels below the all-time record of 41 bushels of 1966.

Just before harvest, scab was found to be prevalent throughout central and southern Illinois. This is a disease that infects the wheat head during and just after pollination. The infected spikelets or "meshes" die prematurely. The entire spike or "head" may be infected. But normally just a few spikelets or "meshes" will be infected and die. The infected area will appear bleached, and often a light pink or salmon color will be observed at the base of the infected spikelet. The diseased kernels are usually shrunken and wrinkled. They may also exhibit the salmon or pinkish color.

The fungus that causes the disease is *Gibberella zeae*. This also causes *Gibberella* stalk and ear rot in corn. Since the fungus overwinters on corn stalks, there is always a potential danger of scab on small grain. Whether small grain is infected seems to depend on the weather conditions during the very short time that the small-grain flower is susceptible to infection.

There is no known resistance to the disease among wheat varieties, yet incidence of scab often differs greatly between varieties. These differences in the degree of infection are believed to be related to the weather conditions at time of flowering and the fact that varieties may differ several days in the time at which they reach the flowering stage.

Blueboy was damaged more by scab in 1970 than any other variety, probably because it is later in maturity and reached the flowering stage when weather was ideal for scab infection to take place. The weather conditions at the time the earlier varieties flowered were not favorable for infection. Whether Blueboy will be infected by scab in 1971 is not predictable because this will depend on weather conditions at flowering time. On the other hand, the danger of stem or leaf rust infection remains a greater threat to Blueboy than with other varieties because of its late maturity. Low test weight appears to be a continuing problem with Blueboy.

Arthur continued to perform well in Illinois in 1970. At 13 out of 21 locations it led all other varieties in yield.

Parker and Triumph 64 were the best hard red winter wheat performers this year. Parker should increase in acreage because of its yielding ability and excellent straw strength.

*Yields of Leading Wheat Varieties in Agronomy Department Tests
at DeKalb, Urbana, and Brownstown*

	DeKalb			Urbana			Brownstown			Average of 20 locations ^{b/}	
	1970 Bu./A.	1969-70 Bu./A.	1969-70 T.W.	1970 Bu./A.	1969-70 Bu./A.	1969-70 T.W.	1970 Bu./A.	1969-70 Bu./A.	1969-70 T.W.	Yield Bu./A.	Test weight
<i>Soft Wheat</i>											
Arthur	58.8	65.4	56.0	63.4	66.5	59.0	53.4	56.5	57.5	54.7	58.1
Benhur	50.7	57.5	58.5	61.3	65.5	59.0	49.7	52.8	58.5	48.3	57.8
Blueboy	45.4	56.7	50.5	48.1	64.3	51.5	63.5	68.7	56.0 ^{a/}	54.4	53.9
Knox 62	53.8	58.4	57.0	56.9	58.9	59.0	58.0	55.9	59.0	49.4	58.1
Logan	55.7	...	...	55.1	61.4	58.0	...	...	...	...	...
Monon	50.0	58.9	57.5	55.8	60.9	58.0	50.1	50.4	57.5	44.9	56.7
Timwin	51.1	61.6	54.5	49.0	63.1	55.0	45.8	48.4	56.0	...	...
<i>Hard Wheat</i>										Average of 12 locations ^{b/}	
Gage	52.8	57.3	58.0	46.1	53.8	58.0	49.3	45.1	57.5	47.9	57.5
Ottawa	45.2	54.9	59.0	32.5	45.7	58.0	46.5	...	...	43.7	58.6
Parker	53.0	60.4	57.5	41.1	52.3	59.0	53.2	51.5	59.0	51.9	59.6
Pawnee	43.6	49.0	58.5	43.0	50.3	58.0	...	...	...	45.3	57.9
Scout 66	51.6	55.3	57.0	45.0	56.1	58.5	46.9	...	...	49.5	57.1
Triumph 64	51.0	52.9	58.0	53.2	57.8	60.0	58.5	53.6	58.5	54.6	59.7

^{a/} 1970 only.

^{b/} Results of county demonstrations.

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AGRONOMY NEWS

crops and soils

No. 412

October 9, 1970

Crops and Frost

Late-planted corn that was not prematurely killed by the southern corn leaf blight may be immature at the first frost. Such corn is low in feed value and test weight. Also, the kernel structure of immature corn is softer than that of mature corn. These softer kernels are subject to more damage during harvest and storage.

Silage corn frosted before the grain is in the hard-dough stage produces less dry matter and feed nutrients than corn that is beyond that stage when first frosted. The leaves of frosted corn dry rapidly, creating a crop too dry for good ensiling. Corn silage should be made when the moisture content of the chopped material is about 65 percent. As corn dries (whether due to frost or normal maturity), it is more difficult to obtain proper fermentation in the silo. The loss of leaves and ears in the field increases as the moisture content of the plant decreases. Frosted corn intended for the silo should be harvested as soon after frost as possible.

Soybeans with leaves and beans turning yellow are in no danger of injury or a reduction of yield or quality because of frost. However, soybeans with green leaves and green beans in the pod may have the leaves killed by frost. The beans will continue to ripen, perhaps at a slightly slower rate, and will produce a slightly lower yield. If the green pods are killed by frost, the beans will remain green in color, but will dry to a normal harvesting moisture if left standing in the field.

Alfalfa, clover, perennial hay, and pasture grasses offer few utilization problems after frost. Minor digestive disturbances have been reported occasionally when frosted legumes are used for grazing. Even so, frost on these crops need not interrupt the grazing schedule.

Sudangrass and sorghum-sudangrass could cause a problem after frost. Prussic-acid production in the frosted leaves results from enzyme digestion of duhrin, a normal sugar compound in sorghum plants. The prussic-acid level of freshly frosted leaves is usually high. Animals should not be grazed on questionable pasture until the leaves have dried. By the time the leaves are dry, most of the prussic-acid gas will have gone into the air, removing the problem.

Young plant tissue of sudangrass and sorghum-sudangrass contains more prussic acid than older tissue. Sudangrasses should be at least 18 inches tall and sorghum-sudangrasses at least 24 inches tall before grazing. A crop shorter than these heights is not safe to graze after frost.

Potentially, new growth from sudangrass or sorghum-sudangrass following the first frost presents the greatest risk. Warm weather following the first frost may allow the plants to shoot-up new tillers. Such fields should not be grazed until the new tillers are 18 inches tall on sudangrasses or 24 inches tall on sorghum-sudangrass. There are a few days of grazing between the first frost and the time when tiller growth is such that animals can obtain enough potentially high, prussic acid-producing forage to be dangerous.

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NA, ILLINOIS



AGRONOMY NEWS

crops and soils

December 28, 1970

Number 413

Grain Sorghum

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With the outlook for the 1971 corn crop the way it is, you may be considering putting some of your intended corn acreage into grain sorghum. If so, there are several things about producing grain sorghum you should consider.

First, take a look at your market. If you plan to feed the grain sorghum you raise, there is no problem. But before growing sorghum as a cash crop, you should locate an elevator or feed mill that will purchase the crop, or find some other outlet for it.

It is also important to consider the harvesting and drying problems grain sorghum presents. Unlike corn, the sorghum plant does not die and dry as the grain matures. This may involve some harvesting headaches for you. The stalk and leaves tend to remain green after the grain is mature, and may remain green until a killing frost. However, it is not wise to wait for a killing frost before harvesting, since the frost-killed sorghum plants are likely to lodge severely. Thus, you must have drying facilities. Grain-sorghum harvesting can begin safely at the 25-percent moisture level.

Count on using more power for drying sorghum than for corn. Sorghum is denser. It packs tighter and harder in the bin, making it more difficult to move the drying air through the bin than with corn.

Birds present another problem. However, some bird-resistant varieties are now available. You may want to investigate these varieties, especially if your sorghum will be near buildings or wooded areas.

Insects can also be a problem. Many of the insects that attack corn--such as corn leaf aphids, European corn borer, corn earworms and wireworms--may also attack the grain sorghums. However, sorghum midge and sorghum webworms probably represent the greatest concern. Proper identification of the insect problem followed by timely spraying is your best defense.

Grain sorghum yield reports vary somewhat. One field at the Dixon Springs Agricultural Center averaged 127 bushels an acre in 1969. The highest yield there in 1970, however, was 100 bushels per acre. From 1967 to 1969, four varieties grown at the Southern Illinois University research fields near Belleville averaged 128 bushels an acre. The SIU researchers estimated the 1970 average yield at about 112 bushels per acre.

Some grain sorghums make excellent, high-energy silage. The total yield is equal to or higher than corn.

Grain sorghum has the edge on corn during some stress conditions. Sorghum comes through drought better than corn. It will also stand flooding better.

If you decide to go with grain sorghum, plan to start planting after the soil temperature reaches 60° F. This would normally be about May 15 in southern Illinois, and late May in northern Illinois.

The rate of planting would depend on the size of the seed and the row width. Shoot for around 100 thousand plants per acre, which is about 4 to 6 pounds of seed per acre. Plant it shallow--no more than 1.5 inches deep, and plant in narrow rows--no wider than 30 inches. Fertilize the same as you would for corn.

Sorghum seedlings grow slowly and offer little competition to weeds early in the season. Therefore, chemicals may be your best bet for weed control. There are several preemergence herbicides, but some of these (such as Propazine) may not be readily available outside the "sorghum belt." Those that are readily available in Illinois include Ramrod, atrazine, and the Ramrod-atrazine combination. Atrazine may also be used as an early postemergence spray. 2,4-D may be used after the sorghum emerges.

There should be no great problem of seed supplies for the 1971 planting season. Many major seed corn companies will have grain sorghum seed to sell.

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MAR - 5 1971

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Number 414

January 1, 1971

Sorghum Silage--A Substitute for Corn Silage

A short supply of seed corn resistant to southern corn leaf blight may make substitute crops more important in 1971, especially those used for silage. Sorghums are the best substitute crop for silage production on dairy or beef farms.

The feeding value of sorghum silage is about 90 percent of good corn silage. Since there is an apparent shortage of hybrid corn seed, it seems advisable to use as much of the seed corn for grain production as possible and to use sorghum for silage production on livestock farms.

The desirable characteristics of sorghums for silage are high yield, high percent of grain, and good standability. Limited variety trials on sorghum have been conducted in Illinois. The data shown in the table are from the Dixon Springs Agricultural Center near Simpson. Only a few of many hybrids available were included in this trial.

Sorghum Variety Trial, Dixon Springs, 1970

Brand	Variety	Silage yield (30% dry-matter) (tons/A.)	Percent grain	Height (in.)
Northrup, King.	.300	22.6	45	82
Northrup, King.	.280	22.5	52	62
Asgrow.	Double TX	20.4	53	65
DeKalb.	.F61L	20.3	49	58
Pioneer	.866	20.0	49	60
Pfister Assoc. Growers. . .	.515	18.7	51	56
DeKalb.	.C48a	17.5	55	54
Pioneer	.885	17.5	44	48
Northrup, King.	.270	17.0	48	45
Pioneer	.814	16.2	46	54
Pfister Assoc. Growers. . .	.430	15.1	45	50
Northrup, King.	.127	14.7	31	44
Northrup, King.	.265	13.4	49	56
DeKalb.	.B-32a	12.2	33	47

Other varieties include Pioneer 930 and 931, which are tall (12 feet), have excellent lodging resistance, are low in grain yield and high in fiber content--higher than in most other varieties. However, feeding trials indicate that the utilization of these varieties is better than would be expected according to the fiber content.

Other forage sorghum varieties that have had a high yield record in regional tests are: DeKalb's FS-24 and FS-26; Paymaster's Three Little Indians; Rudy Patrick's 30-F, 40-F, and 55-F; and Taylor-Evans' Goldmaker, Milkmaker, Silomaker, and Yieldmaker.

Sorghum-sudangrass hybrids are usually lower in dry-matter production than forage sorghums when harvested as silage. They also lodge more and create greater harvesting problems. Sorghum-sudangrass hybrids are best suited for green-chopping and grazing. Because they are difficult to dry, sorghum-sudangrass hybrids are a poor choice for hay.

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Extension Dairyman

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AGRONOMY NEWS

crops and soils

NA, ILLINOIS

January 4, 1971

No. 415

Buckle-Up for Blight

ATTEND EXTENSION AGRONOMY DAYS

The corn leaf blight situation, prospects, crop alternatives, and production adjustments will be discussed. Check with your county Extension adviser's office or watch for announcements in the local newspaper for the time and place of the meetings. Get prepared for the 1971 cropping season by first getting the information you need in order to make wise decisions.

Three basic types of meetings will be presented throughout the state.

CROPS AND SOILS MEETINGS. Corn hybrids, blight resistance, planting suggestions, fertilization, and tillage considerations will be discussed.

WEEDS, INSECTS, AND DISEASES MEETINGS. Control measures for weeds and insects, the severity of infection, and the disease outlook will be covered, along with grain drying.

GENERAL MEETINGS. These will include brief discussions of the topics above, except for the special programs indicated in the following list.

Date County		Meeting type			Date County		Meeting type		
		Crops and soils	Weeds, insects, & diseases	General			Crops and soils	Weeds, insects, & diseases	General
JANUARY					JANUARY				
5....Christian		X			14....Greene-Jersey-Calhoun			X	
5....Logan		X			15....Boone-Winnebago		X		
5....Mason		X			15....Grundy		X		
5....Stark				X	15....Kankakee		X		
5....Clinton				Weeds	15....Morgan-Scott-Cass			X	
6....Ford			X		15....Menard-Sangamon			X	
6....Iroquois			X		19....Ogle-Lee-Whiteside			X	
7....Bureau				X	19....Coles			X	
7....LaSalle			X		19....Moultrie			X	
8....McLean				X	20....Greene-Jersey-Calhoun		X		
8....Livingston				X	20....Carroll				Forages
8....Menard-Sangamon		X			21....Christian			X	
11....Hancock				X	21....Boone-Winnebago			X	
12....Ogle-Lee-Whiteside		X			21....DeKalb-Kane			X	
12....Edgar				X	21....Morgan-Scott-Cass		X		
12....DeWitt		X			21....Jefferson				X
12....Macon		X	X		22....Grundy			X	
13....Woodford-Peoria-Tazewell			X		22....Kankakee			X	
13....DuPage				X	22....Stephenson				X
13....Ford		X			22....Carroll-JoDavies				X
13....Iroquois		X			22....Williamson				X
14....LaSalle		X			25....Champaign-Piatt			X	
14....DeKalb-Kane		X			25....Vermillion				X

		Meeting type					Meeting type		
		Crops and soils	Weeds, insects, & diseases	General			Crops and soils	Weeds, insects, & diseases	General
Date	County				Date	County			
JANUARY					FEBRUARY				
26....	Coles	X			11....	Crawford			Tillage
26....	Champaign-Piatt	X			11....	JoDaviess			X
FEBRUARY					12....	Edwards			X
1....	Adams-Brown-Pike-Schuyler			X	16....	Perry			Forages
1....	Clinton-Piatt-Monroe- Washington				17....	Fulton			X
2....	Mercer			X	17....	Jackson			Weeds
2....	Warren			X	18....	Macoupin			X
2....	Logan		X		18....	Madison			X
2....	Mason		X		18....	Piatt			X
2....	Bond			X	19....	Lawrence			X
2....	Montgomery			X	19....	Richland			X
3....	Rock Island		X		22....	Wabash			X
3....	Fayette			X	22....	Wayne			X
3....	Shelby			X	23....	Saline-Gallatin			X
4....	Clay			X	23....	Williamson			X
4....	Effingham			X	23....	Massac			Weeds
4....	Marion			X	23....	Perry			X
4....	McHenry			X	24....	Hamilton			X
5....	White			X	24....	Franklin			X
5....	Jackson			X	25....	Crawford			X
					25....	Jasper			X
					26....	Clark			X
					26....	Cumberland			X

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AGRONOMY NEWS

crops and soils

January 29, 1971

No. 416

1971 Oat Varieties

The 1970 growing season was a rough one. The average yield for oats in Illinois was 59 bushels per acre, the lowest since 1964.

The yield results from the Northern Illinois Experiment Field at DeKalb and the Agronomy Research Farm at Urbana-Champaign are shown below. However, keep in mind that the poor growing season caused a wide variation in yields.

Variety	Location					
	Northern Illinois Experiment Field			Agronomy Farm		
	1970 Bu./A.	1969-1970 avg. Bu./A.	Lb./Bu.	1970 Bu./A.	1969-1970 avg. Bu./A.	Lb./Bu.
Brave	94	83	30	104	85	30
Clintford	96	83	33	94	74	32
Clintland 64.	96	81	32	79	65	27
Froker.	134	..	..	57	..	..
Garland	94	86	31	93	77	29
Holden.	103	90	30	85	72	28
Jaycee.	85	84	30	108	94	34
Kota.	85	86	30	105	92	29
Newton.	104	87	30	92	80	31
Nodaway 70.	87	..	..	97	..	..
Orbit	111	93	30	111	88	28
Otter	107	..	..	121	..	..
Pettis.	...	..	..	105	91	34
Portal.	95	87	31	75	67	27
Tyler	88	77	30	95	79	29

If you have been using the Clinton or Clintland varieties, you should consider Clintland 64. It is superior to the other Clinton-type oats, especially in rust resistance.

Froker, a new, late-maturing variety released by the University of Wisconsin, is quite late. It probably should be grown only in the extreme northern part of Illinois, where high temperatures during kernel filling and ripening are not likely to occur.

Garland, a popular variety in Illinois, matures at midseason. It has good straw strength, some resistance to smut, and a good yield record. Garland is well suited to northern and central Illinois.

Jaycee may fill the bill for an early maturing variety. It is very short, and stands well until maturity. After ripening, it does lose straw strength, however. Jaycee has a high yield record, and is highly resistant to barley yellow dwarf virus. It has some resistance to many rusts and smuts.

Kota, a variety released by South Dakota in 1969, was well accepted in Illinois in 1970. Kota matures about two days later than Garland. It is somewhat taller, but still has good straw strength. Kota is moderately resistant to stem and crown rust, and has some tolerance to barley yellow dwarf virus.

Newton is an early variety with good straw strength and some tolerance to barley yellow dwarf virus. However, it is susceptible to prevalent races of rust.

Otter, a new variety developed at the University of Minnesota, is commercially available for the 1971 season. It is similar in maturity to Garland, grows to about the same height, but is somewhat more resistant to lodging.

Pettis is a relatively new variety. It is an early, red-hulled one developed at the University of Missouri. Pettis has medium-tall straw, is subject to lodging, and has excellent tolerance to the barley yellow dwarf virus. This variety is probably best adapted to the soils and weather conditions typical of south-central Illinois, rather than to those found further north.

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ILLINOIS AGRICULTURAL EXPERIMENT STATION

AGRONOMY NEWS

crops and soils

March 10, 1971

No. 417

Soybean Management and Varieties for 1971

The versatility of soybeans showed up clearly again in 1970. At least half the crop was planted after June 1. But the average yield for the state was only 2.5 bushels below the 1969 record and was the same as the third-highest average ever recorded.

The rule-of-thumb that corn yields decrease a bushel for each day's delay in planting after early May does not hold for soybeans. The penalty for planting soybeans late is less than for many crops. The same is true for planting rate.

At Urbana during the three-year period 1958-1960, Clark planted June 1 averaged only 1.5 bushels per acre less than that planted on May 12. In 1970, the penalty for a similar delay (from May 7 to May 21) in planting Calland was greater--averaging nearly 5 bushels per acre. But the yield of Beeson dropped only 2 bushels in the 1970 study.

The earlier soybean varieties will often yield more when planting is done in late May or the first of June, rather than before that. In the 1958-1960 study, Chippewa produced 36 bushels per acre, planted on June 1; and 33 bushels, planted on May 12. Corsoy followed the same trend in 1970. It produced 56 bushels per acre planted on May 7; but 62 bushels, planted on May 21. So the practice of planting corn before soybeans makes good sense. The loss in corn yield from delayed planting is much greater than the loss in soybean yields.

Planting-rate studies show the highest soybean yields with a population of 9 to 12 plants per foot of row in 40-inch rows, 6 to 8 plants in 30-inch rows, 4 to 6 plants in 20-inch rows, and 3 to 4 plants per foot in 10-inch rows. However, overplanting is necessary to reach these harvest populations. Also, you need to know the germination of the seed you are planting. If only 85 percent of the seed germinates, be sure to allow for this--plus slightly more--when calculating your seed needs.

Soybean yields are not seriously affected by variations in population. In 1970 at the University of Illinois Agronomy South Farm near Urbana, three varieties--Calland, Beeson, and Corsoy--averaged 50, 53, 51, and 51 bushels per acre when there were 12, 6, 4, and 3 plants per foot of row, respectively, in 30-inch rows. These results are similar to those of previous years, convincing us that there is an optimum population. Even so, the penalty for having more or fewer plants per acre than the optimum is relatively small.

Variety choices for 1971 are about the same as in 1970. Rampage is new. It has been released by Iowa State University and the USDA. Rampage matures at about the same time as Hark--5 to 7 days earlier than Corsoy, Amsoy, and Beeson.

Several new private varieties will be marketed in 1971. Some were entered in the 1969 and 1970 University of Illinois tests of commercial soybeans. The results of these tests are recorded in Circular 1030, *1970 Performance of Commercial Soybeans in Illinois*, Cooperative Extension Service, University of Illinois at Urbana-Champaign, January, 1971.

The accompanying table shows results of the U.S. Regional Soybean Variety Yield Trials and several county demonstrations in 1970.

Variety	Yield (bu./A.)						County
	DeKalb		Urbana		Eldorado		demonstrations
	1970	1968-1970	1970	1968-1970	1970	1968-1970	1970
Rampage.	53	47	..	..	..	..	33 ^a /
Hark	51	48	45	49	50	..	38 ^a /
Corsoy	64	57	51	53	51	40	42 ^a /
Amsoy.	63	53	51	52	49	44	40 ^a /
Beeson	61	53	54	50	54	46	42 ^a /
Wayne.	64	..	49	50	52	45	41 ^b /
Calland.	56	..	50	48	56	48	43 ^b /
Clark 63	..		..	..	..	..	40 ^b /
Cutler	..		48	47	55	44	43 ^b /
Kent	..		52	47	54	46	..

a/ Twenty-five county demonstrations.

b/ Six county demonstrations.

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NA, ILLINOIS

AGRONOMY NEWS

crops and soils
Number 418

March 29, 1971

Weed Control for Corn

Careful selection and use of herbicides, supplemented with timely cultivation, controls most of the major, annual weeds in corn. Good herbicides, with relatively good corn tolerance, are available for both annual broadleaf and grass weeds.

Preplant or preemergence herbicides are now used on about three-fourths of the corn acreage in Illinois. On about one-third of this acreage, 2,4-D is used postemergence.

PREPLANT

AAtrex may be applied within two weeks before planting; usually, the closer to planting, the better. Preplant means broadcasting. But the cost of broadcasting is considered reasonable, especially on the lighter soils where relatively low rates are adequate. Mixing AAtrex with fluid fertilizer is popular in some areas. There is no urgency about incorporating AAtrex. However, if weather is dry, there may be some advantage in getting the herbicide into more-moist soil to enhance absorption by weed seedlings. But usually, the incorporation of AAtrex should be relatively shallow in order to avoid dilution.

Sutan may be applied preplant, alone, or in combination with atrazine. The combination can improve the control of grass weeds and reduce atrazine residue. Applying Sutan with fluid fertilizers is popular practice, but considerable care should be taken to make the applications accurate and uniform. This will help avoid corn injury. Sutan, alone or with atrazine, may be applied within two weeks before planting and should be incorporated immediately. A prepackaged wettable powder mixture with 36-percent Sutan and 12-percent atrazine will be available in 1971.

Lasso may be applied preplant, alone or in combination with atrazine. Incorporation is optional. For panicum control, surface application is preferable, but for nutsedge control, incorporation is desirable--especially if rainfall is light. Lasso may be applied within seven days before planting. Adjust rates according to soils, and weed species. If Lasso is incorporated preplant, usually the rate should be slightly higher than for a preemergence treatment.

PREEMERGENCE

AAtrex applied at planting time or shortly afterward continues to perform well. It controls most of the major, annual broadleaf weeds and is exceptionally good for smartweed control. Combining a good grass killer with atrazine can often help control annual grass weeds, such as foxtail and panicum.

Ramrod continues to be popular as a band-applied granule on soils with an organic-matter content of more than 3 percent. Ramrod's grass control, supplemented with an early post-emergence application of 2,4-D, provides one of the most effective and economical programs for corn.

Ramrod-atrazine has an excellent performance record with good crop tolerance, broad spectrum control, and reduced residue. Using the granules of this combination is under consideration, but currently it must be applied as a spray. Because of the irritation caused by the Ramrod wettable powder and other aspects of handling and applying, this combination has probably not gained as much acceptance as its performance would justify.

Lasso is adapted to a wide range of soils. The granules have been popular. The liquid formulation has some handling advantage over the more-irritating Ramrod wettable powder. Lasso's control of annual grasses has been very good, and it provides one of the best answers for taking care of panicum and nutsedge. There was some injury to certain corn hybrids in a few cases during 1970. Although the problem was not considered serious, we suggest that growers check with their chemical dealers and seed companies to avoid using Lasso on the more-sensitive hybrids.

Lasso-atrazine has been similar to Ramrod-atrazine in terms of performance. Some growers and applicators prefer the Lasso liquid formulation to the Ramrod wettable powder, since the Lasso formulation is less irritating. Also, since Lasso is formulated as a liquid, the Lasso-atrazine combination requires less of the wettable powder and a smaller amount of water for spraying.

Knoxweed continues to have some acceptance because it is available as granules. It controls both broadleaf and grass weeds and presents no residue problem. Although sometimes satisfactory, Knoxweed's record of consistent performance is not quite as good as that of some other materials, and there has been occasional crop injury.

Londax is a combination of Lorox and Ramrod. It is available in both granular and wettable-powder form. Weed control has often been relatively good, but with Lorox in the combination there is some risk of corn injury.

POSTEMERGENCE

AAtrex and oil has generally given good control of broadleaf weeds, including smartweed. Under favorable conditions, small grass weeds may also be controlled. Some injury to corn has occurred. Occasionally, this has been severe. Follow label precautions very carefully.

2,4-D continues to be an effective, low-cost treatment for the control of broadleaf weeds. There is some corn injury each year, but the acreage with severe injury is usually not extensive. Although AAtrex is more costly, it is an alternative that can provide greater crop safety and better smartweed control, preemergence or preplant.

Banvel continues to be used each year on a limited amount of acreage. Injury to nearby soybeans is not uncommon, and occasional injury to corn has occurred. A major reason for using Banvel is to control smartweed. For this purpose, AAtrex--preplant, preemergence, or possibly postemergence--would involve less risk of injury to nearby, desirable plants.

Always read the label precautions and restrictions. Use the right rate in the right way at the right time.

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NA, ILLINOIS

AGRONOMY NEWS

crops and soils

April 1, 1971

Weed Control for Soybeans

Number 419

Weed control in soybeans should be part of an overall control system. Good cultural practices that include timely weed control by mechanical means, supplemented with a wisely chosen herbicide, can provide the most-effective weed control at the least cost. Herbicides provide in-the-row weed control and wet-weather insurance, but depending completely on chemical weed control can lead to disaster if the herbicide fails to perform.

Broadleaf weeds are often the biggest problem in soybeans. Most preplant and preemergence herbicides control annual grasses and pigweed, but provide greatly varying control of tough weeds, such as velvetleaf, cocklebur, smartweed, and morningglory.

When selecting your herbicide, consider your soil and equipment, as well as the time of application. A preplant application commits you to broadcasting, but it also makes incorporation possible. Treflan, Planavin, and Vernam are three preplant herbicides that should be incorporated. Lasso should be incorporated if you want to control a serious infestation of yellow nutsedge.

PREPLANT

Treflan (trifluralin) is one of the better herbicides for controlling annual grasses and Johnsongrass seedlings. It needs thorough incorporation within 8 hours after application. Treflan can be applied up to 10 weeks before planting. Remember, however, that disking too early will expose the soil to wind erosion.

Planavin (nitralin) controls the same weeds as Treflan, but it is not adapted to soils with over 3 percent organic matter. Planavin can be applied up to 6 weeks prior to planting. Incorporation can be omitted if adequate rainfall occurs within 48 hours after application.

PREPLANT OR PREEMERGENCE

Vernam (vernolate) can be applied preplant as a liquid or preemergence in the granular formulation. Incorporation usually improves weed control, but may cause greater soybean injury.

Lasso (alachlor) can be applied preplant or preemergence. Incorporation is only recommended if yellow nutsedge is a problem. Lasso also controls most annual grasses and pigweed. It is adaptable to a wide range of soil textures if the rate is adjusted properly. There is considerable interest in a tank-mix of **Lasso plus Lorox** to control a greater number of weeds on different soils.

PREEMERGENCE

Lorox (linuron) is best adapted to soils with a low organic-matter content, except for sands. The rate of application is one pound per acre of Lorox 50W for each percent of soil organic matter, when used alone. Reduced rates are used in combinations. Lorox controls many types of weeds, but crop tolerance is close. Lorox is usually the overlay herbicide chosen for the "stale seedbed" method of soybean production. It is often used in double-cropping wheat and soybeans, because it has some contact activity.

Amiben (chloramben) is one of the most-popular soybean herbicides, especially on high organic-matter soils. It has a broad spectrum of control, but does not control annual morningglory. A commercial combination of Amiben plus linuron, called **Amilon**, will be available in limited quantities for use on the lower organic-matter soils.

Noraben (norea plus chloramben) is a combination of Herban (norea) and Amiben. Norea is similar to linuron. The Noraben combination is best adapted to soils with a medium to high organic-matter content.

Chloro-IPC (chlorpropham) is one of the most-effective herbicides for controlling smartweed. It is usually applied over a preplant herbicide, such as Treflan, or with a preemergence herbicide, such as Lasso.

Solo (chlorpropham plus naphthalam) is a combination of Chloro-IPC and Alanap. This combination will do a fair job of controlling many broadleaf weeds, but it is somewhat weak on annual grasses. Soybean stunting sometimes occurs.

Preforan (C-6989) is a new herbicide for soybeans that can control annual grasses, smartweed, and pigweed. It gives fair control of jimsonweed and ragweed, but not of velvetleaf and cocklebur.

Decthal (DCPA) is a grass-control herbicide used primarily on vegetable crops, but it is also cleared for use on soybeans. The rate must be adjusted to the soil.

Shamrox is a combination of DCPA and linuron.

Ramrod (propachlor) and Londax (linuron plus propachlor) are preemergence herbicides for corn that are also cleared for "seed beans," but not for soybeans that are to be used for food, feed, or oil purposes. Full clearance for these materials on soybeans is not expected for 1971.

If weeds are growing and your herbicide is not working, don't wait for rain. Use the rotary hoe or rolling cultivator to keep weeds in check until rain occurs. Postemergence herbicides can also be used to control escaped broadleaf weeds.

POSTEMERGENCE

This type of herbicide has not been very popular for soybeans in the Corn Belt. None of the postemergence herbicides do a good job of controlling grasses. However, they are effective on many of the difficult-to-control broadleaf weeds. Although soybean tolerance is close with the postemergence herbicides, the beans usually outgrow the symptoms of early injury.

Premerge and Sinox (dinoseb) are frequently called "dinitro." They can be applied at soybean emergence (cracking stage) or as a directed spray. Dinitro is a contact herbicide that controls emerged weeds with little residual action.

Dynap is a combination of dinitro (naphthalam plus Alanap). **Premerge 21 and Dynoram** are combinations of dinitro plus chloramben (Amiben). These are combinations of a contact herbicide (dinitro) plus a preemergence herbicide for application at the cracking stage. Such treatments allow the emerged weed seedlings to be controlled with the dinitro, while the preemergence herbicide is left to control the weeds that are yet to emerge.

Tenoran (chloroxuron) will control many broadleaf weeds after they emerge but before they are 1.5 to 2 inches tall. The addition of a suitable surfactant greatly enhances activity. To minimize injury, the trifoliolate leaves should be formed on the bean plants before application.

Butyrac 175 or Butoxone SB (2,4-DB) can control cocklebur, annual morningglory, and giant ragweed, but soybeans are frequently injured. Such injury is reduced if the spray is directed so it stays off the top of the soybeans.

Always read the label precautions and restrictions. Use the right rate in the right way at the right time.

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AGRONOMY NEWS

crops and soils

April 29, 1971

Number 420

Winter Injury to Alfalfa

Winter killing or injury to alfalfa has been found throughout Illinois this spring. The greatest damage was in the northern half of the state. Heaving in alfalfa fields was severe in some parts of southern Illinois. Such damage was usually associated with late-fall grazing, usually continuous grazing throughout the fall period, or late-fall cutting. As usual, the very poorly drained soils also had heaving problems.

The winter injury to alfalfa in northern Illinois was not from heaving. Plants were either killed or their vigor was reduced, causing slow growth this spring. A period of no snow cover and strong, cold winds may have been the major cause. Poor fall management could also have been a problem in some fields. Some of the less-winter-hardy varieties suffered slightly more injury than the very hardy ones, but winter-hardiness is probably not a major reason for the injury to alfalfa last winter.

Careful Management

You can prevent the recurrence of winter injury by carefully managing alfalfa stands. Provide ample fertility--especially potassium, phosphorus, and lime. Place alfalfa on well-drained soils, ones that also have good surface drainage. Harvest the last normal cutting by September 1-5 in northern Illinois, September 10-15 in the central section, and September 20-25 in southern Illinois. Also, discontinue grazing by these dates. Late-fall harvesting or grazing is all right in central and southern Illinois where heaving is not a problem. This harvest should be taken only if the forage is needed. The mulch produced by leaving the September-October growth on the field helps to insulate the soil, reducing frequency and intensity of the freezing-thawing activity in the late winter and early spring. Alternate freezing and thawing is what causes the soil to heave. Mulch also helps protect the plant crowns from cold, drying winds when fields lack snow cover.

Stands that have been injured during the winter may be maintained a year or more at a lower yield potential. Top yields can be expected from two- and three-year-old stands or older ones if there are 4 to 5 vigorous alfalfa plants per square foot. If there are 3 plants or less per square foot, the yield potential is reduced markedly and the decision about whether to plow-up these fields depends on the alternatives that exist for hay or pasture.

New Seedings

New seedings of alfalfa could have been made this spring in oats. However, if the maximum amount of legume hay production is needed, the alfalfa could have been seeded without a companion crop, using herbicides to control the weeds. This practice has been very successful on experimental fields as well as on many farms throughout south-central, central, and northern Illinois. Seeding in early April is very necessary in order to reduce weed problems and establish a high yield potential. Too many problems occur if the seeding is done after May 1. This practice is not recommended.

Three herbicides are available. Two are for preemergence use, Balan and Eptam. They must be incorporated before planting, and will kill grasses and some broadleaved weeds. A mixture of alfalfa and grasses, such as brome grass, orchard grass, timothy, and the like, could not be seeded because the herbicides will kill the germinating grasses. Balan and Eptam can

be used with legumes such as alfalfa, birdsfoot trefoil, crownvetch, and clovers. The other herbicide is 2,4-DB. It is for postemergence use when alfalfa or some other legume is in the second to third, true leaf stage. Alfalfa is usually 3 to 4 inches tall at this time. Butyrac and Butoxone are trade names for 2,4-DB.

Providing Forage

What can be done to provide forage for livestock this summer and next winter? First, make the most of what you have. Fertilize legumes for top production. Fertilize bluegrass pasture with up to 75 pounds of nitrogen with 15 to 20 pounds P_2O_5 and 45 to 50 pounds K_2O . Fertilize bluegrass immediately if this was not done earlier in the spring. Fall production from bluegrass can be increased by fertilizing in late August with 50 pounds of nitrogen. The tall grasses, such as smooth brome grass and orchardgrass, should be fertilized immediately with 75 to 100 pounds of nitrogen. The phosphorus and potassium requirement will vary according to the soil type and expected yield. At least 30 pounds P_2O_5 and 125 pounds K_2O will be needed. Fertilize the tall grasses with an additional 75 pounds of nitrogen in August.

The second option would be to seed a summer annual. Use a sudangrass or a sorghum-sudan hybrid for grazing or green-chop. The sudangrasses are preferred for grazing because of their finer stems, lower prussic-acid potential, and greater ability to recover growth after grazing versus the sorghum-sudan hybrids. The sorghum-sudans are preferred for green-chopping because of the higher yield potential associated with the less-frequent harvesting of this practice compared to grazing. Sudangrass hay is difficult to make, but would be easier than sorghum-sudan.

If silage is needed, use corn, grain sorghum, or forage sorghum. Sorghum-sudan hybrids are also usable, but they have less grain and usually are lower in silage yield than corn or forage sorghum.

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AGRONOMY NEWS

crops and soils

June 6, 1971

Number 421

Controlling Marihuana

Marihuana, or wild hemp, is now classified as a noxious weed in Illinois. This means it is unlawful to have it growing on your farm. Not only is marihuana considered a menace to our society, especially for some of our young people, it may also encourage undesirable trespassing on your land. Learn to recognize marihuana; also how to get rid of it. You will be doing yourself and society a favor.

IDENTIFICATION

Marihuana is an annual plant that grows only from seed each year. In Illinois, the seed begins to germinate in April. New plants may also start from seed, germinating later in the season.

Although marihuana is well adapted to fertile soils, it is not usually found in cultivated crops such as corn and soybeans. Watch for it along fences, railroads, roadsides, ditch-banks, and other noncrop areas.

Each leaf on the marihuana plant is made up of an odd number of leaflets--five, seven, nine, or eleven. The usual number is seven. The leaflets have a palmate arrangement. They join together at the base, somewhat like the fingers on your hand. Each leaflet is long and narrow, with notched or sawtoothed edges.

The stems are somewhat grooved, with branches coming out just above the leaves. Crowded plants may not have any lower branches. Widely spaced plants may be rather bushy. The plants can grow to ten feet or more in height. They feel rather rough and coarse and are sometimes confused with giant ragweed (horseweed). Giant ragweed leaves, however, have three main lobes and are not divided into the long narrow leaflets with notched edges, as are marihuana leaves. The cinquefoil leaves resemble those of marihuana, but cinquefoil is a much smaller plant with small flowers that have yellow petals.

Marihuana plants are of two kinds, male and female. The male plants have many small, greenish-yellow flowers at the top. After producing pollen, the male plants wither and die. The flowers of the female plants are not quite as conspicuous; but after pollination, the female plants become bushy, produce seed, and may remain green and vigorous until frost.

Marihuana was raised as a fiber crop in Illinois during World War II, but was present as a weed before that time. It may be found in many parts of Illinois, but is most prevalent in the northern two-thirds of the state.

CONTROL

The laws against the sale or possession of marihuana are rather severe. Most farmers realize their moral obligation to control marihuana plants and to remove this temptation from the environment.

Control measures should be aimed at preventing seed production. Pulling and hoeing are effective for a few plants or for small patches of them. Mowing is effective if the area is accessible.

There are two other ways of discouraging the growth of marihuana. One is to cultivate the area and grow row crops. The other is to establish a good, vigorous stand of desirable grasses or legumes.

Spraying provides a simple, low-cost, and very effective means of control. For best results, spray in May or June while the plants are relatively small--twelve inches high or less. If new plants grow, spray again as needed.

The most-economical spray is 2,4-D. It should be used when plants are small. Silvex is similar to 2,4-D, and will also provide good control.

Using about one quart of 2,4-D or silvex with fifty gallons of water for each acre to be sprayed and thoroughly wetting the plants is usually adequate. For older plants, the amount of 2,4-D and water may be increased. But be certain to spray before the marihuana plants produce seeds.

Precautions should be taken with 2,4-D or silvex to prevent injury to nearby susceptible plants. In such areas, amitrole-T at the rate of one gallon per acre mixed with fifty gallons of water would be safer. This application has been extremely effective. However, do not spray amitrole-T on desirable grasses. Such spraying may kill these grasses. If you are too busy with field work during June, consider hiring someone to do the spraying.

Next fall, seed some smooth brome grass or other desirable grass in fencerows and on other noncrop land. Such competitive cover will discourage the growth of marihuana, as well as other weeds. This cover will also provide good wildlife cover and will protect the area from erosion. Such seeding is simple to do and low in cost. It provides permanent control, with little follow-up needed in future years.

If a few weeds or some marihuana happen to come through the brome for a year or two while the grass is becoming established, 2,4-D or silvex can still be used without killing the grass. Do not use amitrole-T on the grass.

By controlling marihuana on your farm, you will be making an important contribution to the quality of our environment.

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Urbana, Illinois



AGRONOMY NEWS

crops and soils

May 11, 1971

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AT URBANA-CHAMPAIGN

Field Tours

University of Illinois at Urbana-Champaign
Agronomy Research Centers and Fields

SEE RESEARCH IN PROGRESS. HEAR DISCUSSIONS ON TOPICS OF
CURRENT INTEREST ABOUT CROPS AND SOILS.

Field	Date	Time (CDT)
Brownstown.	June 16.	9:30 a.m.
Urbana (Agronomy Day).	June 24.	7:00 a.m.
DeKalb.	July 1.	10:00 a.m.
Belleville ¹	July 21.	1:00 p.m.
Carbondale ²	July 22.	1:00 p.m.
Dixon Springs	August 12.	10:00 a.m.
Toledo.	August 24.	1:00 p.m.
Carlinville	August 25.	1:00 p.m.
Carthage.	August 26.	1:00 p.m.
Aledo	August 27.	1:00 p.m.
Hartsburg	August 30.	1:00 p.m.
Kewanee	August 31.	2:00 p.m.
Brownstown.	September 1.	9:30 a.m.
Elwood.	September 2.	1:00 p.m.
Dixon	September 3.	1:00 p.m.

¹ Sponsored by Southern Illinois University.

² Sponsored jointly by Southern Illinois University and the University of Illinois at Urbana-Champaign.



□ Research Centers
● Research Fields

Agronomy Research Tours

See and hear research reports on

Soil fertility

Crop varieties

Weed control

Insect control

Plant diseases

Tillage practices

*Extension advisers and agronomy specialists will conduct tours, lead discussions,
and answer questions.*

*L.V. Boone
Agronomist*

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AGRONOMY NEWS

crops and soils

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Number 423

crops / soils summer '71



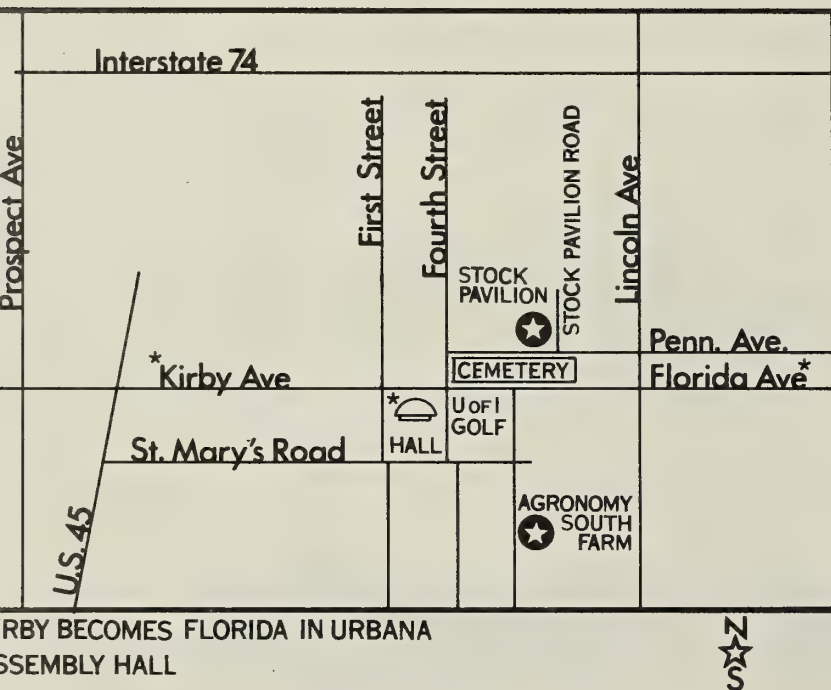
**agronomy
day**

**Thursday, June 24
University of Illinois
Agronomy South Farm
Urbana
Tours begin at 7 am**

**Fifteen tour stops for you
to see and discuss with
U of I agronomists**

- Southern Corn Leaf Blight
- Alfalfa Disease and Insect Control
- Forage Crop Varieties
- High Oil Corn and Its Implications
- Genetic Male Sterility for Hybrid Seed Production
- Genetic Types of Soybeans
- Insect Control
- Spring Small Grains
- Lead--A Soil Pollutant
- Optimizing Nitrogen Use
- Nitrates in Soil Drainage Water
- What, When, How and How Much N, P and K?
- Double-Cropping with Zero-Till
- Winter Small Grains
- Weed Control for Corn

crops/soils summer '71



☐ Agronomy Day tours start at 7 a.m. New tours will start every 10 minutes thereafter until 1 p.m. Each tour lasts about 2 1/2 hours. Fewer stops and less walking this year. But more to see at each stop.

☐ If you fly into the U. of I. Willard Airport, call 333-2965 for transportation to the Agronomy South Farm. There will be parking on the grounds for those who drive.

☐ Lunch will be available on the grounds and there will be a refreshment stand.

☐ If it rains, Agronomy Day will be held in the U. of I. Stock Pavilion.

See you there June 24!

W. R. Oswald

W.R. Oswald
Extension Agronomist

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AGRONOMY NEWS

crops and soils

July 16, 1971

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No. 425

Alfalfa Harvesting Schedules for Summer and Fall

Early and frequent harvesting of alfalfa produces a forage with high digestibility, promotes rapid recovery growth, and results in a moderate to high yield. Except for corn silage, the digestibility of alfalfa and other forages declines as the plant ages. This decline is much greater with advancing age at the first cutting than at second, third, and fourth cuttings. To obtain the greatest amount of nutrients, first-cutting alfalfa should be harvested at the late-bud to first-flowering stage, and about every 35 days thereafter until the last desirable harvest date in the early fall. Although bud formation and blooming are not always exact indicators, they serve as convenient and reasonably reliable ones.

Harvesting when there is a good supply of soil moisture and the plant has recharged its root system with sugars and starches encourages the rapid recovery of alfalfa. The 35-day interval between cuttings provides adequate time for sugar and starch build up in the roots. If the first cutting is harvested by the late-bud stage, the second cutting will usually be ready before the soil moisture is depleted.

The highest yields of hay are obtained by harvesting the first cutting at one-half to full bloom and successive cuttings at 40- to 45-day intervals. However, this delayed harvesting schedule results in lower digestibility and fewer feed nutrients per acre. Thus, the highest yields and greatest production of digestible feed nutrients do not match in a harvesting schedule. It is usually considered more desirable to sacrifice some yield in order to obtain a high performance from the animals that eat the hay.

To maintain a vigorous alfalfa stand through the winter, the plants need to build up a high level of sugars and starches in the roots. To help promote this build up, do not harvest or graze alfalfa during the food-storage accumulation period, which is about six weeks before a killing frost. These are the suggested, latest summer harvest dates for Illinois: the northern quarter--September 1; the central half--September 10 to 15; and the southern quarter--September 15 to 25.

Fertilizing in the late summer or early fall will strengthen alfalfa stands and better prepare them for winter survival. Apply about half the annual required

rate of phosphorus and potassium at this time. Potassium is known to be an important nutrient for winter hardiness but other nutrients should not be ignored.

A harvest of alfalfa in late October or early November is allowable on well-drained soils throughout the southern three-quarters of Illinois. If heaving is a potential problem, however, either do not take this late fall harvest or replace it with a ton or more of straw or strawy manure per acre. The mulch left on the soil reduces the frequency of the freezing-thawing cycles that cause heaving.

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AGRONOMY NEWS

crops and soils

July 19, 1971

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No. 426

SEP 15 1971

August Is Pasture Renovation Time

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Summer is an excellent time to improve pastures by establishing new legume and/or grass species. The first objective in establishing a good seeding is to destroy unwanted grasses and weeds. Second, fertilize and lime according to soil needs and the crop you plan to seed. Third, prepare a seedbed just adequate for good seed-soil contact. Fourth, seed early enough so the plants will become well established before winter.

Unwanted plants can be eliminated by severe overgrazing in July and early August. Uprooting the plants by disking or some other type of tillage practice will help the sun kill the weakened plants.

Test the soil and apply lime to correct the soil pH so it is 6.5 to 7. Also, apply phosphorus and potassium according to soil-test indications. Apply most of the fertilizer prior to soil tillage in order to distribute the fertility through as much of the seedbed as possible. If you plan to band the seed, some of the phosphorus should be applied at seeding time.

Work the seedbed as little as possible. Be sure most of the weeds are killed and that the soil is loosened on the surface. It is helpful to roll the seedbed with a corrugated roller before sowing the seed. Roll it again after seeding to assure good seed-soil contact. A firm seedbed is important for getting the seed in contact with moist soil.

Place forage grasses and legume seeds on the soil surface. The small seeds should not be placed deeper than a quarter of an inch.

Seed pasture species by August 10 in the northern quarter of Illinois, by August 30 in the central half, and by September 15 in the southern quarter.

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AGRONOMY NEWS

crops and soils

September 27, 1971

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1971 Wheat Results

The 1971 wheat yields were exceptionally high. The Illinois Cooperative Crop Reporting Service estimates the 1971 state average yield at 44 bushels per acre, a new record. Record yields were recorded in the University tests at Urbana and Brownstown, but winter killing severely damaged the test at the Northern Illinois Experiment Field in DeKalb County. The drill-width plots there were abandoned. The yields given for the northern location are from the nursery trials. These were also damaged, but less severely.

The new varieties, Arthur 71 and Centurk, are included in the 1971 results. Seed for these will not be commercially available until after the 1972 harvest.

ARTHUR 71 was developed at Purdue University. It is a soft red winter wheat variety, similar to Arthur in plant height and maturity. Arthur 71 has greater resistance to leaf rust and Hessian fly than Arthur. Arthur 71 has the same excellent resistance to stem rust, loose smut, powdery mildew, and soil-borne mosaic as Arthur.

CENTURK is a hard red winter wheat variety developed at the University of Nebraska. The name Centurk is a contraction of "Centennial Turkey," derived from the Turkey wheat parentage in the cross and the upcoming centennial of the introduction of Turkey wheat into the United States in 1873-74. Centurk matures at the same time as Scout 66 but grows from 4 to 6 inches shorter. Centurk possesses good resistance to leaf rust, stem rust, and lodging.

BLUEBOY continued to dominate at the Brownstown Experiment Field and in the county variety demonstrations. Arthur is a better performer at Urbana and DeKalb. The difference is probably related to winter-hardiness.

Soft wheat is increasing in popularity in Illinois. In 1971, 68 percent of the wheat acreage was planted in soft red winter wheat. Five years ago, the acreage was divided equally between hard and soft wheat. Prior to that, more hard than soft wheat was planted. Two factors have contributed to the shift from hard to soft wheat. One is that farmers in northern Illinois planted less wheat in 1971 than five years ago. Historically, the hard red winter wheat varieties have been used in the northern half of the state; the soft wheat ones, in the south. The second reason is the yield advantage and improved winter-hardiness of the soft wheat varieties such as Arthur, Benhur, and Monon. Soft wheat is adapted farther north in the state now than ten to twenty years ago.

The state average wheat yield has almost doubled during the last twenty years. The 1947-1951 average was 21 bushels per acre, compared to 38 bushels for 1967-1971.

**Yield Record of Leading Varieties in Agronomy Department,
Tests and County Demonstrations^a**

													Average, county dem- onstrations, 9 locations bu./A.
	DeKalb				Urbana				Brownstown				
	1971		1970-71		1971		1970-71		1971		1970-71		
	bu./A.	T.W.	bu./A.	T.W.	bu./A.	T.W.	bu./A.	T.W.	bu./A.	T.W.	bu./A.	T.W.	
<i>Soft wheat</i>													
Arthur	45	59	59	57	87	58	73	59	76	59	63	58	67
Arthur 71	43	60			83	59			79	58			
Benhur	48	59	54	59	75	56	69	58	68	59	58	58	62
Blueboy ^b	23	36	46	46	67	51	65	51	91	54	76	55	73
Knox 62	43	60	53	58	73	58	64	59	67	59	60	59	60
Monon	49	59	56	58	70	57	64	58	84	58	62	57	61
Timwin	55	57	59	55	74	55	60	55	71	54	56	54	68
<i>Hard wheat</i>													
Centurk	53	59			71	58			81	58			
Gage	48	59	54	58	67	58	58	58	59	56	50	57	66
Ottawa	47	60			67	61	53	59	57	58			60
Parker	49	60	56	59	70	60	59	59	78	60	60	60	65
Pawnee	45	60	48	59	65	59	55	55	53	56			62
Scout 66	51	59			62	59	58	59	60	58			62
Triumph 64	34	61	47	60	66	58	60	60	71	59	60	56	59

^aUniversity of Illinois at Urbana-Champaign.

^bYield reduced because of winter damage.

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AGRONOMY NEWS

crops and soils

September 30, 1971

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No. 428

Frost and Fall Crop Management

The first hard frost raises many questions as to the effect it will have on our crops and how we should handle them.

The grain crops--corn, soybeans, and grain sorghum--are generally all mature enough to be free of maturity difficulties from frost except for some double-crop soybeans and grain sorghum. These are the soybeans and grain sorghum planted following a small grain or first-cutting hay crop which may not be mature at the first frost.

Soybeans that have green leaves and green beans in the pod when killed by frost will continue to ripen, probably more slowly than normal. If the beans are well formed, nearly mature, but still green, they will turn yellow in storage. Very immature beans may retain a green color in storage, however.

Grain sorghum is a new crop for many Illinois farmers this year. Most grain sorghum varieties maintain grain moisture too high for storage until the plants are killed by frost. However, severe lodging can be expected after frost; so mature grain sorghums should be harvested before danger of frost. If severe lodging of grain sorghum occurs before harvesting, the crop may be cut with a header-swather and combined after drying with a combine equipped with a pickup attachment. Also, grain sorghum fields may be salvaged by grazing with cattle to utilize severely-lodged grain.

Grain sorghum stubble is a good source of low-quality forage for fall grazing. The stalks contain more sugar than corn stalks, and the leaves are not all destroyed during combining. New tillers may be produced after harvesting which are high in prussic acid potential; these may cause problems if cattle are obtaining a large part of their forage intake from the new tillers. Frost on grain sorghum stubble is not likely to cause prussic acid problems, but the risk can be reduced by avoiding grazing until the frosted tissue has dried. A light frost may not affect sorghum forage as much as corn because the stalks and leaves of sorghum have a higher sugar content. The sorghums can be expected to stay greener longer into the fall and to make growth for grazing.

Grain sorghum is mature when the greenest seeds are about 35-percent moisture. If frost occurs prior to this stage of development, some reduction in grain yield and lower test weight can be expected.

Forage sorghums, sorghum-sudangrass hybrids, and sudangrass may be grazed following a frost after the vegetation has dried if the crop was safe to graze before the frost. Sudangrass should be at least 18 inches tall and sorghum-sudangrass hybrids, 24 inches tall. These sorghums as well as Johnsongrass and Sorghum alnum contain a phenolic compound, dhurrin. Enzyme digestion of dhurrin produces cyanide gas, commonly called prussic acid. Frost breaks plant cells and allows dhurrin to contact plant enzymes, resulting in a rapid release of prussic acid. Therefore, it is suggested that animals not graze freshly frosted sorghums. Prussic acid is lost from the plant tissue as it dries, making dried forage safe for feeding.

Ensiled forages with a high prussic acid level are considered safe because of the aeration of the forage in normal feeding operations. Also, when the entire plant is harvested, there is less risk of prussic acid levels being dangerous because the older plant parts, which have a low level of dhurrin, will be mixed with younger tissue having a high level of dhurrin. The resulting whole silage mass will have a low prussic acid potential.

Animals can safely consume a low level of material producing prussic acid because they can exhale some cyanide gas. But when a high concentration of prussic acid material is eaten in large amounts, the animal can not get rid of the cyanide fast enough and becomes poisoned.

Alfalfa and clovers are not plagued with such great problems. They are good pasture materials after frost. Some slight digestive disturbances may occur among grazing animals on freshly frosted legumes. The problem is minor, so there is little concern about pasturing frosted legumes.

Freshly frosted perennial hay and pasture grasses cause little or no difficulty to grazing animals.

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UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Number 429

October 25, 1971

Utilizing Pasture and Crop Residues in Winter

Beef and sheep can forage outside most if not all the winter period in Illinois. The feed needed by breeding herds and flocks may be little or no more than that available from grass pastures, alfalfa-grass hayfield fall growth, or stalk pastures left after harvesting corn or sorghum.

Winter pasture programs for beef cows have centered on tall fescue. The summer growth is either baled (round bales), stacked (by a new mechanical method), or just allowed to accumulate from early July on. Fescue palatability improves in the fall and winter, compared with the summer. Fescue growth is greater during the cool season, making more growth in late fall than most other popular grasses adapted to Illinois.

Winter pastures of tall fescue should be fenced into small units for best utilization. This is particularly true if round bales have been left in the field to supplement the winter feed. A unit for grazing may be large enough for three or four weeks of grazing. Restricting the amount of forage available results in less waste by the animals.

Alfalfa hayfields or rotation pastures may be grazed after the first of November. By this time, the alfalfa plant has stored nearly all the sugars and starches it will for the year, and there will be very little regrowth to use up the stored foods this fall. Removing the top growth results in little winter damage or reduced yields the following year if the soils are well drained and no heaving has been experienced. If soils are not well drained and the heaving of alfalfa is often a problem, allow the accumulated growth to remain. That growth will act as an insulation blanket, reducing the frequency of freezing and thawing in the soil in January, February and March.

Being less winter-hardy than brome grass or timothy, orchardgrass may be injured by winter grazing in central and northern Illinois. Since orchardgrass stores its energy reserves in the base of the stem, grazing should be controlled to retain at least a 2.5-inch stubble. The late-summer growth of orchardgrass that is not grazed or harvested during August, September, and most of October may carry one to two animal units per acre until mid-December.

Brome grass, bluegrass, and reed canarygrass are more winter-hardy than orchardgrass; therefore, may take a little more severe winter treatment. However, a 2.5-inch, minimum stubble height should be maintained to protect the energy stores in the base of the stems, to trap snow in the fields, and to reduce heaving. Although heaving is less severe on grasses than on taprooted legumes, damage does occur to grasses when the heaving is severe.

Timothy has its food storage in a bulb-like structure under the soil surface. Therefore timothy could withstand shorter grazing than the other major grasses without noticeable injury.

Corn stalks afford suitable, high-energy winter grazing for beef cows. When their nutritional status is good, these animals can winter-graze corn stalks with a minimum amount of protein and mineral supplement.

Grain sorghum stalks make excellent pasture after combining the grain, since the leaves and stalk remain green until killed by a hard frost. After a frost, grain sorghum stubble should be safe for grazing after it has dried.

Forage sorghum and sorghum-sudangrass stockpiled--that is, whole season growth left standing--provide satisfactory pasture for beef cows and stocker animals. The recovery growth of stubble after early fall harvesting of forage sorghum should be allowed to reach 30 inches in height before grazing. This practice will reduce the risk of prussic-acid poisoning. As with the sudans and other sorghum types, the forage is safe to graze after a frost when it is dry, *if* it was safe for grazing before the frost.

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BANA, ILLINOIS



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No. 430

Store Herbicides *Safely*

With the close of harvest season and the approach of winter, it is time to check your herbicides to see that they are properly stored. Be sure to keep them in a safe place, so that children, pets, farm animals, and irresponsible people cannot get to them. Then *lock* that storage place. If you do not have a separate storage room, you might consider building a low-cost wire cage in one corner of your machine shed.

Do not store herbicides close to food, feed, fertilizer, or other chemicals, such as insecticides. Some pesticides are volatile, and contamination might occur. Also check for open or broken bags and containers.

Store pesticides *only* in the original containers. If the label is gone, dispose of the pesticide. If the label is not completely legible but you can tell for sure what it is, ask your dealer for a new label. DO NOT STORE ANY PESTICIDE IN SOFT DRINK BOTTLES, HONEY JARS, OR OTHER CONTAINERS THAT CHILDREN MIGHT RECOGNIZE AS ONES FOR FOOD OR DRINK. Do not put pesticides in feed bags or other containers from which the contents might mistakenly be fed to livestock later.

Store liquid herbicides, such as some of the 2,4-D concentrates and Treflan, at temperatures above freezing. If the basement is the only warm area, use some good judgment about what materials to store there and how to store them. Although some herbicides are not highly toxic and are not very volatile, others could be a real problem if a container should leak or break. Just a little 2,4-D escaping from a container in the basement might find its way to the living room of the house and damage house plants.

Freezing may break some containers or cause some herbicides to crystallize, or "salt out." Sometimes the frozen material will go back into solution after adequate warming and agitation, but it is best not to let it freeze in the first place. In some cases, the use of held-over herbicides that have been frozen and later thawed may explain the lack of weed control. Most dealers know the effects of freezing and thawing, and provide adequate storage facilities. They also know what storage precautions to take with each material.

Store wettable powders and granular herbicides in a cool, dry place. The area does not need to be heated, but be sure the containers are sealed and the material does not get damp or wet. Also, do not store such herbicides on oily floors.

When ordering your pesticides for next year, try to figure your needs close enough to avoid having a lot of carryover to store. One of the best ways to dispose of approved herbicides is to use them. Discarding large quantities in one place may not be wise.

Now is also a good time to make a safety check of your spray equipment and order needed parts. Do not forget to drain and clean your equipment. Check the screens and clean or replace them as needed. Be sure to drain water from the pump and any other parts that could be damaged when water freezes. Lubricate when necessary. Check hoses and clamps. Replacing old ones can help you get the pesticide where it belongs, instead of on yourself. Be sure that replacement hoses are of appropriate design and strength.

Replace the brass nozzle tips on herbicide sprayers after each one has been used for spraying 100 acres. Studies show that the hole in the nozzle tip increases in size with use and wear and that the uniformity of the spray pattern can change, causing uneven applications. Such spraying might affect weed control and could also increase the chances that certain herbicides might damage crops. Nozzle tips cost so little that you probably will not have anyone giving you a high-pressure sales pitch to buy them. But you will be doing yourself a favor by replacing them.

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AGRONOMY NEWS

crops and soils

December 14, 1971

Number 431

Agronomy Days Take Regional Approach

CROPS SOILS WEEDS DISEASES INSECTS ENGINEERING MARKETING

These topics or combinations are coming your way in January or February. Look for local announcements for exact dates and locations.

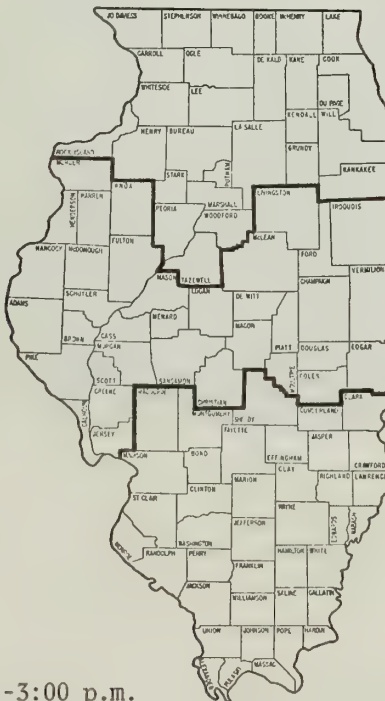
Meetings are scheduled in these areas during these periods:

January 11-14

January 18-25

February 1-8

Time: 9:30 a.m.-3:00 p.m.



COUNTIES

January 11	JoDaviess-Stevenson-Carroll Whiteside-Ogle-Lee	Winnebago-Boone McHenry-Lake	DeKalb Kane
January 12	Peoria-Woodford-Tazewell Marshall-Putnam	Will-Kendall DuPage-Cook	Kankakee Grundy
January 13	Henry-Rock Island Winnebago-Boone	McHenry-Lake DeKalb	Stark Kane
January 14	JoDaviess-Stevenson-Carroll Whiteside-Ogle-Lee Kankakee	Will-Kendall DuPage-Cook LaSalle	Grundy Bureau

January 18	Henderson Vermilion Iroquois	Warren Mercer Piatt	Knox Ford
January 19	McDonough Moultrie	Hancock Fulton	Edgar Coles
January 20	Pike-Schuyler-Brown Livingston	Dewitt McLean	Adams Macon
January 21	Jersey-Calhoun-Greene Morgan-Cass-Scott	Menard-Sangamon Christian	Mason Logan
January 24 & 25	Champaign		
February 1	Bond-Madison-Macoupin- Montgomery Pulaski-Alexander-Union	Franklin-Williamson Hamilton	Fayette Wayne
February 2	Pope-Hardin-Massac-Johnson Gallatin-Saline	Jefferson Jackson	Perry
February 3	Pulaski-Alexander-Union Williamson-Franklin Shelby	Effingham Wabash	Clay White
February 4	Massac-Johnson-Pope-Hardin Jasper-Cumberland Richland-Lawrence	Crawford-Lawrence Gallatin-Saline Jefferson	Jackson Perry Clark
February 7	St. Clair-Monroe	Washington	
February 8	Bond-Madison-Macoupin Montgomery	Fayette	

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AGRONOMY NEWS

crops and soils

Merry Christmas



AGRONOMY EXTENSION STAFF

Left to right (Front) D.W. Graffis, J.E. Dillon, S.R. Aldrich, M.D. McGlamery, M.G. Oldham, and L.F. Welch. (Back) W.O. Scott, L.V. Boone, E.L. Knake, W.M. Walker, W.R. Oschwald, and M.D. Thorne.

Happy New Year

We send you GREETINGS and BEST WISHES for the Christmas Season and throughout the New Year.

We hope to see you at one or more of the meetings listed on the back in your area this year. The latest results and interpretation of research as it applies to Illinois Agriculture will be presented. Plan now! Watch for your Extension Adviser's announcement as to location and time of Agronomy meetings in your area.

January 2	/Monroe/Soil Use Pulaski-Alexander/Crops & Soils	January 30	/Logan/Corn & Soybeans Mason/Crops & Soils
January 3	/Clinton/Soil Testing & Weed Control Johnson-Union/Crops & Soils Perry/Crops & Soils	January 31	/Macon/Crops & Soils Tazewell/Crops & Soils
January 4	/Fayette/Crops & Soils Jackson/Pasture & Silage Franklin/Crops & Soils Macoupin/Soil Use & Testing	February 1	/Crawford/Crops & Soils Marshall-Putnam/Crops & Soils
January 5	/Sangamon/Soil Use & Classification Christian/Crops & Soils Randolph/Crops & Soils	February 2	/Hancock/Crops & Soils Jasper/Crops & Soils McDonough/Corn & Soybeans
January 8	/Grundy/Corn & Soybeans Will/Corn & Soybeans	February 6	/Knox/Crops, Soils, & Insects Warren/Crops, Soils, & Insects Wabash/Crops & Soils
January 9	/Bond/Crops & Soils Coles-Cumberland/Crops & Soils Gallatin-Saline/Crops & Soils Morgan/Crops & Soils Sangamon/Crops & Soils	February 7	/Edwards/Crops & Soils Fulton/Corn & Soybeans
January 10	/White/Soybeans & Corn Moultrie/Crops & Soils Hamilton/Crops & Soils	February 8	/Henry/Crops & Soils Richland/Crops & Soils Stark/Crops & Soils
January 15	/Woodford/Crops & Soils	February 9	/Mercer/Crops & Soils Randolph/Alfalfa, Clovers, & Grasses Rock Island/Crops & Soils Lawrence/Crops & Soils
January 16	/Cass/Crops & Soils Clay/Crops & Soils Lake/Crops & Soils Monroe/Weeds & Insects McHenry/Crops & Soils Menard/Crops & Soils Washington/Weeds & Insects	February 12	/Grundy/Weeds
January 17	/DuPage/Crops & Soils Greene/Crops & Soils Jersey/Crops & Soils Jefferson/Weeds & Insects Marion/Soybeans Williamson/Crops & Soils	February 13	/McLean/Crops & Soils Wayne/Crops & Soils
January 18	/Wayne/Weeds & Insects Vermilion/Crops & Soils Pike/Corn & Soybeans Massac/Crops & Soils	February 14	/Jefferson/Crops & Soils
January 19	/Kankakee/Crops & Soils Edgar/Crops & Soils Adams/Crops & Soils Wabash/Weeds & Insects	February 15	/Piatt/Weeds Washington/Crops & Soils
January 22 & 23	/Champaign/Crops & Soils	February 16	/Livingston/Corn & Soybeans Marion/Crops & Soils
January 26	/Ford/Corn & Soybeans Iroquois/Corn & Soybeans	February 22	/Effingham/Crops & Soils
		February 27	/Clark/Soybeans Carroll/Crops & Soils Schuyler/Pastures & Agr. Chemicals Whiteside/Crops & Soils
		February 28	/Lee/Corn & Soybeans Ogle/Crops & Soils
		February 29	/Winnebago/Crops & Soils Boone/Crops & Soils DeKalb/Crops & Soils Kane/Crops & Soils
		March 1	/LaSalle/Crops & Soils
		March 5	/Brown/Weeds
		March 6	/Henderson/Weeds

These meetings will be presented by one or more Extension Agronomists from the University of Illinois. We will be looking for you!

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Extension Agronomist

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UNIVERSITY OF ILLINOIS
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AGRONOMY NEWS

crops and soils

March 20, 1972

Number 432

Weed Control for Corn PREPLANT HERBICIDES

Adequate tillage is still considered the backbone of this effort. The first step is to start with a weed-free seedbed. Herbicides can be used to replace a portion of the seedbed preparation, especially when minimized tillage is employed. Even where a herbicide has been used, the rotary hoe is still an excellent tool for early control. A majority of growers still use it once or twice. The best time for the rotary hoe is after the weed seeds have germinated and just before the weeds emerge, or very soon afterward.

Research and grower experience suggests that row cultivation is not essential on most Illinois soils in good tilth *if* excellent weed control is obtained with herbicides. However, preplant or preemergence herbicides do not always provide perfect control of annual weeds and usually do not control most perennials, such as milkweed and thistles. Therefore, one or two row cultivations can often be quite helpful.

Herbicides have become a very popular supplement to good tillage. They are now being used on over three-fourths of the corn acreage in Illinois. With the variety of herbicides now available, you have considerable choice about the time of application. Select the herbicides best adapted to your soils, weed problems, and personal preferences.

PREPLANT HERBICIDES

AAtrex (atrazine) is especially well adapted to the light-colored soils, which are relatively low in organic matter. Even on the darker soils, it can perform very well in controlling broadleaf weeds, and is sometimes adequate for control of grass weeds. AAtrex, alone or in combination, is one of the best choices for the control of smartweed.

AAtrex can be applied within the two-week period before planting time. Usually the closer to planting, the better the weed control. AAtrex can be incorporated, but does not have to be; the time of incorporation is not critical. If the weather is dry, incorporating AAtrex into more moist soil may improve absorption by weed seedlings. If you have adequate rainfall, incorporation is not necessary. Keep the incorporation of AAtrex to a relatively shallow depth, in order to avoid excessive dilution and reduced control.

Sutan can be applied alone or in combination with atrazine within two weeks of planting time. The Sutan-plus-atrazine combination has become very popular, and has performed well for weed control. The Sutan strengthens the control of grass weeds. Even with the reduced rate of atrazine in this combination, good control of most annual broadleaf weeds, including smartweed and velvetleaf, is usually realized.

Try to avoid injury to corn from Sutan by being certain that your applications are very accurate and uniform. Incorporate Sutan immediately, preferably by having a spray boom mounted just ahead of the disk or by using other suitable incorporation equipment.

Lasso may be used alone or in combination with atrazine within a week before you plant. Incorporation is optional. Where a reduced tillage system precludes incorporation, Lasso can be surface-applied. It can be helpful for the control of fall panicum and other annual grass weeds. Incorporating Lasso can improve the control of nutsedge; but when you do so,

adjust the rate upward, according to the label, to compensate for the diluting effect of the incorporation. Corn injury from Lasso is not considered to be a serious problem, but has occurred very occasionally.

The preemergence herbicides for corn will be discussed in the next issue of *Agronomy News*.

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AGRONOMY NEWS

crops and soils

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Number 433

Preemergence Herbicides for Corn

[Please refer to your issue Number 432 of *Agronomy News* for information on preplant herbicides for corn.]

AAtrex (atrazine) is especially well adapted to soils with less than 3 percent of organic matter. With the proper rate adjustment, AAtrex can be effective on the darker soils. Combining it with a good grass killer can improve the control of annual grasses. The 4-L liquid formulation may be more convenient to handle than the 80-percent wettable powder but is also higher in cost. Application at planting time or very shortly thereafter is considered as best. AAtrex is one of the top choices for controlling smartweed.

AAtrex should not be used where you plan to plant small grains or small-seeded legumes and grasses this fall or next spring. Injury to soybeans from AAtrex residue has not been considered as a serious problem where appropriate rates are accurately and uniformly applied.

Princep (simazine) performs in a similar manner as AAtrex, but provides better control of fall panicum.

Bladex is a triazine herbicide chemically related to atrazine. It has received label approval for use in 1972. Bladex may give better control of panicum than atrazine but the control of pigweed may not be as good. The potential for effects on subsequent crops from residue is considerably reduced. This could be of particular consideration where horticultural crops, small grains, or small-seeded grasses and legumes follow corn. The manufacturer plans to have Bladex available as granules as well as a wettable powder.

Compared to atrazine, a slightly higher rate of Bladex may sometimes be needed for similar control. Since persistence is lower with Bladex, the length of time weed control is provided may be shorter.

Ramrod is used mainly in granular form for the control of grass weeds. A few broadleaf weeds such as pigweed may also be controlled. Ramrod is adapted primarily to the darker soils. Following Ramrod with an early postemergence application of 2,4-D has provided one of the most-effective and lowest-cost weed control programs for corn.

Lasso is adapted to both light- and dark-colored soils. Like Ramrod, it is primarily for controlling grass weeds. Lasso provides weed control longer than Ramrod, and can be quite helpful for controlling fall panicum. It is available as a liquid and as granules. Lasso may require slightly more rainfall initially than Ramrod. Corn tolerance appears to be slightly less than with Ramrod.

Ramrod plus atrazine has been one of the most effective treatments for controlling broadleaf and grass weeds. It is adapted to a fairly wide range of soil and weather conditions. Corn tolerance has been very good.

The use of this combination has probably not been as great as its performance would justify, because of the necessity of using wettable-powder formulations. The Ramrod wettable powder is irritating to handle, and the amount of wettable powder required means that a fairly high amount of water is also needed per acre. A granule formulation of this combination has looked promising in research tests, and may be available in the future.

Lasso plus atrazine performs in a similar manner to the Ramrod plus atrazine combination, but the amount of initial rainfall needed may be slightly greater and crop tolerance slightly less. However, Lasso plus atrazine is more convenient, since Lasso is less irritating to handle than Ramrod, is formulated as a liquid, and requires less water.

Knoxweed is available in both liquid and granular forms for the control of both broadleaf and grass weeds. However, performance has not always been quite as consistent as with some of the other materials, and crop tolerance has been a little lower.

Londax is a combination of Ramrod and Lorox. Weed control has sometimes been relatively good, but crop tolerance is somewhat limited. Londax has been available in granular form, also as a wettable powder.

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Postemergence Herbicides for Corn

AAtrex plus oil can be used for early postemergence treatment when the weeds are very small. Control of broadleaf weeds, including smartweed, can usually be expected. Under favorable conditions, grass weeds can also be controlled if they are not over 1.5 inches high. Apply this herbicide within three weeks after planting. If applied after June 10, do not plant any crop except corn or sorghum the next year because of increased risk of herbicide residue. Corn may sometimes be injured by an application of AAtrex and oil, especially during wet, cool weather when the corn is under stress.

This treatment has had some acceptance on the darker soils where some growers have been satisfied with it. But, especially on the light-colored silt loams in the southern part of Illinois, preemergence treatment at planting time or a preplant treatment close to planting time is usually preferred.

2,4-D is still one of the most effective and lowest cost treatments for controlling broadleaf weeds in corn. However, there is some risk of corn injury, also some risk of injury to nearby sensitive plants. The increased use of AAtrex for controlling broadleaf weeds has caused a decrease in the use of 2,4-D during recent years. The advantages of AAtrex preplant or preemergence compared to 2,4-D post-emergence are (1) better smartweed control, (2) better corn tolerance, and (3) less risk of injury from spray drift. However, the cost of these advantages is higher, and AAtrex may also present some residue problems.

Banvel may be used postemergence in corn for controlling broadleaf weeds. It is much better than 2,4-D for smartweed control. Since amitrole and amitrole-T are no longer cleared for use on cropland, Banvel may help control Canada thistles. However, Banvel presents a much greater risk of injury to nearby sensitive plants such as soybeans. Even observing some precautions may not entirely eliminate the problem.

The symptoms of Banvel injury to soybeans may be quite apparent. The possibility of soybean yield reduction will depend in part on how much Banvel moves into the soybean plants and when. The more Banvel, the greater the chance of yield reduction.

Do not apply Banvel near bloom time. If you insist on using Banvel, be fully aware of the potential problems. Because of the extent of injury to soybeans in 1971, some insurance companies may exclude liability coverage if you use Banvel.

If Banvel is going to be applied on corn, it should be applied early--preferably before the soybeans have emerged in any nearby area, or at least when soybeans are very small, and as soon as the smartweeds in corn are up. New "foaming agents" and special nozzles help to reduce the fine particles that may drift. Spraying when there is little or no wind also helps, but this does not completely eliminate the risk of injury to nearby sensitive plants.

If you have a smartweed problem, strongly consider the use of AAtrex alone or in an approved combination for preplant or preemergence application.

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crops and soils

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No. 435

Soybean Variety Selection

Five or six leading varieties of soybeans are well adapted to particular areas of Illinois. To make a final selection, consider maturity differences, resistance to disease and lodging, and yield potential. Check the 1972 *Illinois Agronomy Handbook* for these and many other important variety differences. In the few tests conducted, blends of varieties have not consistently exceeded the yield of pure-line varieties. For private variety performance information, obtain a copy of Circular 1046 from your county Extension Adviser.

The relative yield record of varieties should be derived from comparative tests for three or more years and at more than one location in the general area of adaptation. The breeding program of the USDA Soybean Laboratory has evaluated many varieties at several locations in Illinois for many years. The following table shows recent results of the newer varieties developed by the USDA and state-university breeding programs. County demonstration yields are given in Table 2.

Table 1. Soybean Variety Yields, 1969-1971

Maturity group and variety	DeKalb	Pontiac	Urbana	Girard	Edgewood	Belleville ^a	Eldorado
I							
Chippewa 64	41.0	34.0	42.5	...	...	...	...
Hark	43.3	38.0	46.0	...	...	...	...
Rampage	45.4	35.1	...	...	...	...	...
II							
Amsoy 71	51.7	37.3	48.7	48.7	46.5	47.9	51.6
Beeson	51.8	39.6	50.0	46.9	46.1	46.8	53.3
Corsoy	51.3	38.3	51.1	51.3	39.9	47.4	48.9
III							
Wayne	52.5	38.2	47.4	50.6	45.9	51.2	53.4
Calland	...	...	48.1	47.3	47.8	48.9	54.6
Williams	...	...	50.2	49.2	47.4	51.0	55.9
IV							
Cutler	...	...	46.4	46.4	47.0	51.2	55.9
Cutler 71	...	...	47.3	41.3	48.1	51.2	55.8
Kent	...	...	47.9	50.0	50.4	51.2	52.8
Bonus	...	...	47.9	44.6	47.3	51.8	53.6

^a Includes 1969-1970 data from Trenton.

Table 2. Soybean Varieties, County Demonstrations, 1971

Northern Illinois											
County	Chippewa 64	Chippewa + Hark	Rampage	Hark	Harosoy 63	Corsoy	Harosoy + Corsoy	Amsoy 71	Beeson	Wayne	Calland
Carroll	36	35	35	36	..	39	..	38	41	..	..
Grundy	40	49	36 ^a	47	31	47 ^a	30	45 ^a	49 ^a	42	43
Kankakee	..	..	..	37	37 ^b	46 ^b	44 ^b	44 ^b	49 ^b	42 ^b	44 ^b
LaSalle	46	39	31	40	40	49 ^b	..	50 ^a	48 ^a	..	..
Lee ^a	39	43	46	45	..	49	..	44	48	..	..
McHenry	28	29	30	30	..	34	..	31	35	..	..
Mercer	..	..	..	..	44	47	47	49	50	48	55
Stark	..	..	..	..	40	49	45	51	51	50	53
Stephenson	..	..	52	49	..	56	..	52	53	..	..
Winnebago	24	29 ^a	30 ^a	29 ^a	..	33 ^a	..	30 ^a	30 ^a	..	..
Central Illinois											
County	Hark	Harosoy 63	Corsoy	Harosoy + Corsoy	Amsoy 71	Beeson	Wayne	Calland	Clark 63	Cutler 71	Cutler + Clark 63
Douglas	..	36	35	37	43	38	39	42	..	..	..
Fulton	..	49	49	..	50	61	52	58	..	..	..
Henderson ^a	46	35	51	48	49	47	50	50	..	..	..
Iroquois	..	44	47	47	51	54	51	57	..	..	..
Knox ^a	..	43	55	52	57	58	56	58	..	..	..
McLean	..	43	48	44	44	55	56	60	..	..	..
Macoupin	..	38	47	45	46	44	42	40	41	47	45
Monroe	..	27	31	30	31	28	30	31	31	..	..
Morgan	..	47	44 ^a	47	49	48 ^a	44 ^a	44 ^a	41 ^a	47 ^a	..
Peoria	..	47	44	44	48	55	50	53	..	..	..
Sangamon	..	48 ^a	52	50 ^a	50 ^a	46 ^a	48 ^a	49 ^a	..	49 ^a	..
Schuyler	..	41	44	43	46	47	44	45	..	..	..
Shelby	..	46	50	54	57	53	50	53	..	..	..
Tazewell	..	33	35	30	34	33	32	30	..	..	..
Warren ^b	..	42	49	50	51	49	54	53	..	..	..
Woodford	..	49	52	52	54	56	52	53	..	..	..
Southern Illinois											
County	Amsoy 71	Beeson	Wayne	Calland	Clark 63	Cutler	Cutler 71	Cutler + Clarke 63	Kent	York	Dare
Franklin	27	27	43	38	39	..	35	34	37	..	..
Gallatin	28	24	34	38	38	36	36	35	..	..	..
Jackson	27	26	37	39	36	38	..	..	28	42	37
Lawrence	35	29	36	34	33	33	..	34	..	..	..
Madison	44	39	46	40	35	..	36	40	..	..	..
Monroe	31	28	30	31	31	..	29	26	..	..	..
Randolph	34	28	40	37	40	..	28	25	..	24	25
Richland	37	30	37	36	32	..	36	35	..	..	..
White	44	35	36	46	40	39	24	32	..	..	..

^a Average of two tests. ^b Average of three tests

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crops and soils

April 14, 1972

Number 436

Pasture Fertilization: Does It Pay?

Fertilization trials on orchardgrass and reed canarygrass at Urbana and Brownstown in 1970 and 1971 demonstrate that yields can be increased by fertilization. The top yields were 6.7 tons of hay at Urbana and 6.6 tons of hay at Brownstown, each with 400 pounds of nitrogen per acre. These yields were similar to those of alfalfa-grass mixtures in nearby fields.

The Urbana and Brownstown trials showed a yield increase in dry matter of 1 to 1.7 tons for 200 pounds of nitrogen per acre, versus 50 pounds of nitrogen per acre. If nitrogen costs are charged at 10 cents per pound, a \$15 investment in nitrogen returned 1.1 to 1.9 tons of hay. If hay is valued at \$25 per ton, the \$15 invested in nitrogen had a potential return of \$27 to \$48. Thus, it can be profitable to fertilize pastures.

Those pastures that are well supplied with moisture throughout the growing season can utilize high rates of fertilization. Orchardgrass, smooth brome grass, reed canarygrass, and tall fescue are vigorous grasses. With them, 150 to 240 pounds of nitrogen can be used per acre. Split applications of 75 to 120 pounds of nitrogen per acre per application will lengthen the productive season. The first application should be made in late March or early April; the second application, after the first, second, or third grazing. This would depend on when the extra production is most needed, the utilization management of the pasture, and the species. Orchardgrass and reed canarygrass make good growth through the summer if moisture is available. Therefore, the best choice may be to fertilize these grasses after the first or second grazing in order to increase mid- and late-summer yields. Smooth brome grass and tall fescue produce well in spring and fall, but do not make as much growth in the summer. Therefore, the second fertilization for them might be deferred until about August 1, to stimulate more fall growth.

Kentucky bluegrass should be fertilized with 60 to 80 pounds of nitrogen per acre in late March. Timothy can profitably use up to 100 pounds of nitrogen per acre, if applied in late March or early April.

Phosphorus and potassium fertilizer should be applied annually, or else double applications should be made every two years. The need for phosphorus and potassium varies according to the soil's capacity to supply these nutrients and the yield desired. For a yield of 5 tons of dry matter per acre, a soil that is low in phosphorus-supplying capacity needs 55 pounds of P_2O_5 per acre per year. A soil at the high end, would need only 28 pounds of P_2O_5 per acre per year. For a soil with a low capacity to supply potassium, 250 pounds of K_2O per acre per year would be needed to produce 5 tons of forage dry matter, but one that has a high capacity would require only 125 pounds of K_2O .

The 1972 *Illinois Agronomy Handbook* contains the information about soil-nutrient-supplying capacities and about fertilization needs at other yield levels. This publication is available from the county Extension Office or from the Office of Agricultural Publications, 123 Mumford Hall, Urbana, Illinois 61801. The cost is 25 cents per copy.

Pasture fertilization will pay only if the production that is realized can be used. Early spring fertilization with nitrogen gives the greatest response. Too often, there is too much production at this time and a large amount of forage is wasted. About half of the fertilized pasture acreage should be harvested in round bales or hay stacks, in mid to late May.

The bales or stacks can be left in the field or stored and used to supplement late-summer or winter pastures, or as an emergency feed supply.

The fertilization rate should be geared not only to the species involved as well as to the real ability of the land to produce. Rooting depth, moisture supply, and moisture-holding capacity are important points in evaluating soils for pasture use. A soil that permits deep-rooting will usually have a greater reserve of moisture for plants to utilize and more nutrients that plants can obtain than the shallower soils. Generally, the deeper soils can be expected to have a greater potential for pasture yields. An exception would be when irrigation is used on the shallower soils.

Mositure supply and moisture-holding capacity are also influenced by the type of soil. For example, a clay-loam soil can hold more moisture and release it over a longer period of time than a sandy soil. If pastures have a real ability to produce high yields and you are able to utilize a highly productive pasture either by intensive grazing or by harvesting for late-summer or winter feeding, the high fertilization rates will pay.

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Number 437

Sunflower Production in Illinois

Sunflowers for oil, human food, and birdseed can be grown in Illinois. For this purpose, fertile, well-drained soils not subject to flooding are desired.

The quality of the oil from sunflowers is usually higher in northern climates than in southern ones. Yields in Illinois trials during the late 1940's were from about 600 to 2,000 pounds per acre. The yields were usually the highest in the central part of the state. The average yields of varieties in recent Minnesota trials have ranged from 1,600 to 2,100 pounds per acre.

The major hazards for the crop are: insects (especially the sunflower moth larvae), birds, diseases, and weeds. Chemical sprays for insect and disease control may not be economical. The birds problem can be particularly serious close to wooded areas, along rivers and streams, and near cities. Weeds can be controlled through cultivation and by the use of herbicides. Amiben and treflan have clearance for use on sunflowers in Illinois.

Sunflower seeds should be treated with Captan prior to planting. The best time is between late April and early May, even before corn planting, because seedling sunflowers will withstand some frost. Plant between 1 and 3 inches deep, 1.5 inches is preferred if the soil is moist. Plant 20 to 30 thousand plants per acre. Final stands should have two or three plants per foot of row. Row widths of 20 and 30 inches will produce higher yields than the 40-inch spacing. Planting can be done with a corn planter, using plates for flat seeds. The plates will need to be matched to seed size.

To fertilize sunflowers, follow a pattern similar to the one for corn or small grains, except that 40 to 60 pounds of nitrogen should be used. Sunflower seeds are sensitive to salt injury. Therefore, if starter fertilizer is used, it should be placed away from the seed.

There are three principal uses of sunflower seeds, and particular varieties have been identified for each. (1) Sunflowers produce a high-quality cooking oil. (2) Sunflower meats are roasted for human consumption. (3) And sunflower seeds are used for bird food. The Peredovik and Peredovik 66 varieties are high in oil (45 percent), and should be used for the oil market. Mingren is a large-seeded, low-oil (26 percent) variety used for human foods. Arrowhead has medium-size seeds that are low in oil content (30 percent), and that variety is used for bird food. Because of the specific preference for these varieties for the specified uses,

marketing arrangements should be made before you decide which sunflower variety to plant. Certified seeds of the varieties named may be available from Certified seed growers in Minnesota.

Harvesting sunflowers is done with a combine. Special sunflower adapters are needed to minimize the loss from shattering and dropping heads. The adapters are 42- to 52-inch, finger-like pans that project forward from the cutter bar, leaving a 3-inch space between the pans for the sunflower stalks to pass through. The reel needs to be made solid in order to prevent the heads from being thrown out of the combine.

The markets for sunflower seeds are not well established in Illinois. Arranging for marketing contract prior to planting seems to be the best way of handling this problem.

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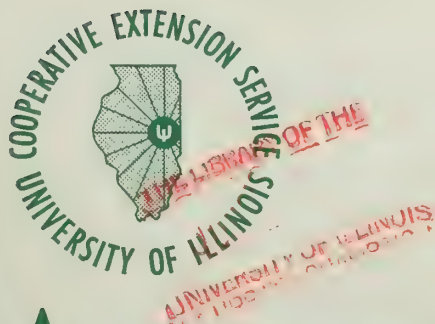


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Preplant Herbicides for Soybeans in 1972

Although the weather may have you in somewhat of a bind this year for time, don't rush so fast with your soybean planting that you neglect weed control. Some growers may be in such a rush to get their soybeans planted that they figure on waiting to consider weed control after the planting is done. However, this narrows the weed-control options. That approach could mean a bigger headache and much more time with less satisfactory or more costly controls later, or even a lack of control and yield losses at harvest time.

Taking a little more time near planting to provide weed control can result in a big crop in the number of weeds and much better yields than you would have otherwise. Even if the time invested in good weed control lengthens your planting period by a few days, the slight delay in planting usually isn't critical with soybeans.

Preparing a good, weed-free seedbed is an important starting point for soybeans. Rotary hoeing and row cultivation are also still important. The use of herbicides to supplement these practices and to improve weed control has become increasingly popular. Herbicides are now employed on over three-fourths of the Illinois soybean acreage.

For preplant treatments that are incorporated, one of the easiest and quickest methods is to have your spray boom mounted directly in front of the incorporation equipment. This helps assure that immediate incorporation takes place and also helps you get the most for your herbicide dollar.

Treflan is one of the most popular materials. It is a consistent performer for preplant incorporation that is intended to control annual grass weeds. Treflan may also control pigweed and lambsquarter. Be sure to incorporate Treflan within eight hours. Treflan is one of the best choices where johnsongrass seedlings or wild cane are a problem.

Planavin performs similarly to Treflan, and is used some in the southern part of Illinois; also, further south, especially where delayed incorporation is necessary. Planavin should be incorporated within two days.

Vernam is also a good grass killer. In addition to wild cane and johnsongrass seedlings, it can help control nutsedge. Vernam can control pigweed and lambsquarter, and may help control velvetleaf. The best performance from Vernam can be

expected when it is used as a preplant, incorporated treatment. Apply Vernam within ten days before planting, and incorporate it immediately.

Some early season injury to soybeans may be caused by Vernam. This may not be reflected in final yields. Be sure to make uniform and accurate applications. This will help prevent injury.

Lasso can be applied preplant within seven days before planting. Lasso has given good control of annual grasses and pigweed. Under favorable conditions and adequate rates, it may control or suppress lambsquarter and common ragweed. When incorporated, Lasso can be helpful for controlling nutsedge. However, the higher rates recommended on the label for the particular soil should be used to compensate for the dilution effect of incorporation and to improve nutsedge control.

Although the use of Lasso may produce a slight malformation of some of the first soybean leaves, this is of little consequence. Soybean tolerance is considered good.

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Preemergence Herbicides for Soybeans in 1972

Amiben continues to be a popular preemergence herbicide for controlling many annual grass and broadleaf weeds in soybeans. Grass control is usually good. Although Amiben takes care of a number of broadleaf weeds, control of annual morningglory should not be expected; also, cocklebur control is often not very good. Velvetleaf and jimsonweed may be kept down under favorable conditions, but the control of these is somewhat erratic.

A new statement on the Amiben label indicates that band applications may be made for broadleaf control over the top of preplant-incorporated grass killers. This double treatment can improve broadleaf control, compared to the use of Treflan alone, and may improve the consistency of grass control slightly. Usually, however, a full rate of Amiben alone gives relatively good grass control. The possibility of crop injury from the double application may depend in part on how favorable the weather conditions are for the vigorous growth of soybeans soon after planting.

One way some growers might improve Amiben performance is to use the rate of 3 pounds of active ingredient per acre. This is equivalent to about 10 pounds of granules or a half gallon of liquid per acre for bands covering a third of the area.

Lasso is used primarily for the control of annual grass weeds and pigweed. Under favorable conditions, some control of a few other broadleaf weeds may result. Soybeans have relatively good tolerance to Lasso, although a slight malformation of some of the first soybean leaves may be noticed. For best results with Lasso, don't skimp on the rate.

Lorox use has increased considerably during the last several years. It is adapted primarily to the relatively light-colored silt loam soils with an organic-matter content of less than 3 percent. Uniform and accurate applications as well as careful rate adjustment are all important in avoiding soybean injury. The rate of Lorox needed will depend largely on the organic-matter content of the soil.

Lorox can also be used to improve broadleaf control following a preplant incorporated treatment with Treflan.

Lasso plus Lorox has also enjoyed increased popularity recently. Lasso strengthens grass control, and Lorox strengthens the control of broadleaf weeds. This

combination is adapted primarily to the silt loam soils with less than 3 percent organic matter. In the major area of adaptation, use about 1-1/2 quarts of Lasso and 1 pound of Lorox 50W on a broadcast basis. Proportionately less in a band can be considered as an alternative.

Preforan can be used as a preemergence application for controlling some annual grasses and broadleaf weeds, such as pigweed, lambsquarter, and smartweed. Velvetleaf control should not be expected. The liquid formulation performed better than granules in 1971. A little early injury to soybeans may sometimes be noted, but this has usually not been of much significance.

Chloro-IPC is especially good for controlling smartweed. Although the federal Environmental Protection Agency indicated that it intended to cancel the registration of Chloro-IPC, we understand that the manufacturer has filed an appeal. That would allow the continued use of this herbicide for soybeans during 1972.

Unless registration is cancelled, Chloro-IPC may be also used for surface application in a tank mix combination with Lasso, or as a surface-applied treatment following Treflan. For smartweed control, the rate for Chloro-IPC alone or in combination is 2 to 3 pounds of active ingredient per acre, broadcast, or proportionately less in a band. It is available at 4 pounds per gallon as a liquid, or as a 10-percent granule.

Solo, a combination of Alanap and Chloro-IPC, usually gives better control of broadleaf weeds than of grasses. Under favorable conditions, Solo may help control smartweed, ragweed, velvetleaf, jimsonweed, annual morningglory, and cocklebur, as well as pigweed and lambsquarter. Combinations of Solo and Lasso and of Treflan followed by Solo are under consideration but are not yet registered by the EPA. Sometimes soybean injury from Solo may occur.

NOTE: Because Solo contains Chloro-IPC, action by the FPA could affect clearance for use.

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Sweetclover Management for Soil Improvement and Livestock Feed

There are many more acres of sweetclover in Illinois today than there were five or ten years ago. Most of this acreage is on diverted cropland, thus fall grazing and soil improvement are the two main reasons for growing sweetclover on these fields. What are the critical management decisions that need to be made?

For soil improvement, do not clip or graze the sweetclover during the seeding year. Cultivate the clover in the spring after 6 inches of top growth in order to reduce the problem of volunteer plants from old crowns.

For livestock feed, clip the clover when it is 8 to 12 inches high, or allow light grazing during the seeding year. The second year's growth should be clipped when it is 6 to 8 inches high, before the plant reaches half-bloom if recovery growth is desired.

There are annual and biennial types of sweetclover. Most of the sweetclover used in Illinois is the biennial type. The management requirements are similar for annuals and biennials during the seeding year.

Biennial sweetclover does not form crown buds until the late summer and fall of the seeding year. Recovery growth after clipping or grazing during the seeding year comes from buds along the stem. Graze lightly or clip high in order to leave a large number of buds on the base of the stems, from which new growth can be generated. The crown buds that develop in late summer and fall give rise to new growth the following spring.

Fall management of sweet clover is similar to that for alfalfa. Provide a resting period from clipping or grazing during September and October. This period is the time during which the plant stores food reserves in the root. This reserve is needed for winter survival and spring growth.

Farmers desiring to plow-down the sweetclover in the fall of the seeding year may do so after the growth stops without sacrificing any significant amount of total nitrogen or organic matter, compared to plowing in the spring. However, fall-plowed sweetclover will usually put up shoots from the crown buds the next spring. It is generally more satisfactory to plant corn following fall-plowed sweetclover than small grains or soybeans because of the greater flexibility in weed-control materials and methods with corn than with the other crops.

If sweetclover is to be plowed in the fall, clipping and/or grazing throughout September and October would weaken the plant and reduce the problem of new shoots coming up from the crown buds next spring.

Spring plowing after the seeding year will usually reduce the number of volunteer sweetclover plants. But it is important to allow about 6 inches of regrowth in order to use up the root energy so the buds, once they are plowed under, will not have sufficient energy to produce many new shoots.

Sweetclover is a good livestock feed as well as a good means of improving the soil. Pasture or wilted silage are the more desirable methods of utilizing sweetclover. Sweetclover is usually too coarse-stemmed to make good hay. Seeding-year growth has a finer stem than that of the second year. If you want to harvest sweetclover for hay or wilted silage, cut the

clover high enough to leave several stem buds, which will produce the needed recovery growth. Hay and wilted silage must be made well so that no spoilage occurs. Spoiled sweetclover develops an anticoagulant that may cause hemorrhaging. Wilt silage to about 65-percent moisture for good precaution in air-tight silos. Bunker or trench silos would be more risky structures for this particular crop; but if used, a moisture content of 75 to 80 percent should be employed.

Second-year sweetclover growth originates from crown buds and is very vigorous. If the crop is permitted to grow without clipping or grazing, it will flower, set seed, and die. To keep the crop more productive through the second year, clip or graze the crop before it is in the half-bloom stage. Clip 6 to 8 inches high so there are some stem buds left for recovery growth. If the crop is very dense, the lower stem buds may be dead; therefore, the need for early clipping or grazing is important.

Each field will need to be evaluated separately. A field in which there is very vigorous growth should be harvested during the very early flowering stage; but a field with a sparse stand may not need to be harvested until the mid-bloom stage.

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1972 Wheat Results

Twenty years ago, in 1952, the average wheat yield in Illinois was 23 bushels per acre. At that time, the goal of most producers was 40 bushels. This year, the average wheat yield in Illinois is estimated at 44 bushels per acre, almost double that of 1952.

Plant breeders are primarily responsible for this dramatic increase in yields. They have developed varieties that resist lodging and are able to stand up under heavy applications of nitrogen fertilizer. The availability of nitrogen fertilizer at a relatively low cost is a second important factor in the improvement of wheat yields.

New varieties that will be commercially available for the first time this fall are Centurk, a hard wheat, and Arthur 71, a soft wheat. Limited amounts of seed for Blueboy II and McNair 4823, soft wheat varieties, may also be available.

Centurk. This is a new variety developed at the University of Nebraska. It may compete with Gage and Parker on the hard-wheat acreage in Illinois. Gage is currently the most popular hard wheat variety in the state; Parker is second. These two varieties accounted for 19 percent of the wheat harvested in Illinois during 1972.

Centurk grows about two inches shorter than Gage and matures at about the same time. Centurk shows slightly more lodging resistance than Gage. It also has good stem-rust resistance and some, but not complete, resistance to leaf rust. Centurk is resistant to soil-borne mosaic and to loose smut.

In yield trials at the University of Illinois, Centurk appears to be well adapted to Illinois conditions. It survived the severe 1970-71 winter better than Pawnee and Triumph at the Northern Illinois Experiment Field in DeKalb County, and its yield record has been good. Seed will be commercially available this year and is worthy of consideration by Illinois producers who grow hard red wheat.

Arthur 71. Since its introduction to commercial growers in 1968, Arthur has become the most popular soft wheat variety in the state. It has gained this popularity despite the fact that it is susceptible to the Hessian fly and to leaf rust.

Arthur 71 is the result of a back-cross breeding program to incorporate Hessian-fly and leaf rust resistance into Arthur. Arthur 71 compares to Arthur in maturity, plant height, and yield. Like Arthur, Arthur 71 is resistant to stem rust, soil-borne mosaic, loose smut, and powdery mildew.

The prevalence of powdery mildew apparently is increasing. As it does, resistance to this disease will become more important to wheat growers. The disease was very noticeable on the Agronomy South Farm during 1972. Susceptible varieties were heavily infected. Arthur 71 seed will be commercially available this year, and it should be high on your list if you plan to plant before the fly-free date.

Blueboy II. This is a new, soft red winter wheat. It is comparable to Blueboy in winter hardiness, maturity, plant height, and lodging resistance. It is superior to Blueboy in leaf-rust resistance and test weight. Both Blueboy and Blueboy II are relatively winter-tender and are subject to winter damage--especially in central and northern Illinois. At the Northern Illinois Experiment Field in DeKalb County, the 1970-71 winter was severe enough that only 22 percent of the Blueboy survived. Blueboy II, like Blueboy, is susceptible to mildew and to the Hessian fly.

McNair 4823. This is a short, stiff-strawed, soft red winter wheat with much the same parentage as Blueboy. It was shorter and lodged less than any other variety in the 1972 test plots. It matures a few days earlier and has a better test weight than Blueboy or Blueboy II. McNair 4823, like Blueboy and Blueboy II, tends to be winter-tender and is susceptible to mildew and to Hessian fly.

As wheat varieties improve, yields will increase. Illinois wheat growers can expect more and better varieties in the future. Researchers made thousands and thousands of crosses during 1972. Most of these will prove to be deficient in some desired characteristic and will be discarded. But a few may develop into the variety you will plant in 1982 or 1987.

Yield Record of the Leading Wheat Varieties in Agronomy Department Tests

	DeKalb		Urbana		Brownstown		Average of 25 county demonstrations
	1972	1971-72	1972	1971-72	1972	1971-72	
<i>Soft wheat</i>							
Arthur	54	55	71	79	67	71	57
Arthur 71	59	51	67	75	64	72	57
Abe	..	..	70	..	64	..	..
Benhur	53	50	56	66	62	65	53
Monon	59	54	56	63	59	71	51
Timwin	62	58	59	67	64	68	..
Knox 62	58	51	60	66	61	64	..
Blueboy	48	35	64	66	68	79	55
McNair 4823	..	..	97	..	60	..	..
Blueboy II	..	..	83	..	72	..	..
							Average of 7 county demonstrations
<i>Hard wheat</i>							
Triumph 64	49	42	55	61	60	66	52
Pawnee	53	49	44	54	44	48	45
Parker	53	51	51	61	48	63	54
Centurk	65	64	55	63	57	69	56
Gage	58	53	49	58	44	51	50
Ottawa	58	53	44	56	45	51	44

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Crops and Frost

The first hard frost raises many questions about the maturity of crops; also, whether it is safe to graze certain crops and whether or not the harvesting schedules of perennial hay crops should be altered.

There is some late-developing corn in northern Illinois that may not be mature when killed by frost. The best use of the crop, would be to ensile the freshly frosted crop before it dries too much. Immature corn killed by frost and left to be harvested as grain carries the risk of stalk breakage and slow drying in the field. The grain harvested is also low in feed nutrients and test weight. The softer kernels are subject to more damage during harvesting and storage.

Mature or immature corn should be ensiled when the chopped whole plant has a moisture content of 60 to 75 percent. The ideal moisture level is 70 percent. Frosted corn stover dries rapidly. Adding water to excessively dry corn fodder will help increase the moisture content, expell some pockets of air, and help achieve proper fermentation. You cannot expect to add large amounts of water and obtain high-quality fermentation and silage. Therefore, it is important to make silage before frost or within a day or two after a hard frost.

Most of the soybeans in Illinois will be well matured well enough before a hard frost. A light frost would not affect soybeans. Soybeans are beyond frost damage when the leaves and beans are turning yellow. Where full-season varieties have been planted in late June or early July, there could be some immature beans. Soybeans that have green leaves and green beans in the pod when killed by frost will continue to ripen, probably slower than normal. If the beans are well formed, nearly mature, but still green, they will turn yellow in storage. However, very immature beans may retain a green color in storage.

Sorghums resist light frosts better than corn. If sorghums are to be ensiled, they can be mixed with too-dry corn silage at the silo in order achieve a more favorable moisture range. The grain of most grain sorghum varieties does not dry to a safe storage level in the field until the plants are killed by frost. However, severe lodging can be expected after frost. Mature grain sorghums should be harvested before the danger of frost. Grain sorghum is mature when the greenest seeds contain about 35-percent moisture.

Severely lodged grain sorghum may be cut with a header-swather and combined after field-drying using one equipped with a pickup attachment. These fields may also be grazed with cattle to salvage the grain and to utilize the leaves and stalks.

Forage sorghums, sorghum-sudangrass hybrids, and sudangrass may be grazed following a frost after the vegetation has dried, if the crop was safe to graze before the frost. For safe use, sudangrass should be at least 18 inches tall; sorghum-sudangrass hybrids, 24 inches. The sorghums, as well as johnsongrass and *Sorghum alnum*, contain a phenolic compound called dhurrin. The enzyme digestion of dhurrin produces cyanide gas, commonly called prussic acid. Frost breaks plant cells and allows dhurrin to contact plant enzymes, resulting in the rapid release of prussic acid. Therefore, animals should not graze freshly frosted sorghums. Prussic acid is lost from the plant tissues as they dry, making dried forage safe for feeding.

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Ensiled forages with a high level of prussic acid are considered safe because of the aeration of the forage in normal feeding operations. Also, when the entire plant is harvested, there is less risk of a high concentration of prussic acid because the older plant parts are mixed with the younger ones. The older plant parts have a much lower level of dhurrin, compared to the younger parts.

Animals can safely consume a low level of prussic acid because they can excrete some cyanide in the urine. But when a high concentration of prussic acid material is eaten in large amounts during a short period of time, the animal cannot excrete enough of the cyanide and can become poisoned.

Such problems are not associated with alfalfa, clovers, perennial pasture, and hay grasses. They still make good pasture materials after frost. Some slight digestive disturbances may occur among grazing animals on freshly frosted legumes. The problem is minor, so there is little concern about pasturing frosted legumes. Freshly frosted perennial hay and pasture grasses cause little or no difficulty for grazing animals.

Harvesting schedules for alfalfa and other perennial hay or pasture crops need not be altered because of the time of the first frost. Alfalfa and clovers that are to be carried through the winter should not be harvested after September 1, in northern Illinois, September 10 to 15 in the central section, and September 20-25 in the southern part of the state. A late October to early November harvest may be made with these crops on the well-drained soils in central and southern Illinois.

Grasses may be grazed after frost and through the fall months, if they are not grazed to less than a 3- or 4-inch stubble.

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AGRONOMY NEWS

crops and soils

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Alfalfa Heaving—Big Problem in 1973?

The wet fall, short hay supply, late-fall cutting, and late-season pasturing may each contribute to an unusual heaving of alfalfa late this winter. Heaving of alfalfa, sweet clover, and red clover is caused by alternate freezing and thawing of the soil in the root zone during February and March. A surplus of water increases the amount of freezing and thawing action. With each cycle of freeze, thaw, and freeze, upward pressure is exerted on the roots of the plants.

The large, fleshy tap roots of alfalfa, sweet clover, and red clover are especially vulnerable to extreme heaving pressures. It is not unusual for these crops to be heaved up 4 to 6 inches, and to be attached to the soil then by only a few fine roots. When plants are heaved out of the soil this much many will die, some will recover to fairly normal vigor, but most will be lower in vigor. It is obviously desirable to prevent heaving if possible.

Internal soil drainage is the most important factor in preventing the heaving of these perennial tap-rooted legumes. Good internal drainage in the soil allows the water to percolate deep into the soil, out of range of the alternate freezing-thawing action. Without free water in the upper one to ten inches of soil, there will be little heaving. Because of the large amount of rainfall received in the fall of 1972, poorly drained soils are likely to have more free water in the upper soil profile than usual, increasing the chances for severe heaving late this winter.

Surface drainage is very important for reducing heaving as well as other winter losses, such as from an ice sheet. Pondered water over alfalfa or clover in the winter time will suffocate the dormant, but living, plant roots. Weakened or dead plants result from long periods of flooding, even in the winter. Weakened plants are more easily heaved than vigorous plants. Surface drainage that eliminates ponds or reduces flooding conditions to one to three days will help lower the chances of creating weakened plants by a lack of oxygen.

There is a shortage of good hay in the Eastern United States, including Illinois. The shortage and high market value of hay in the fall of 1972 encouraged many farmers to make late-fall harvests. Fall harvests taken from mid-September to mid-October did not provide enough time for a complete restoration of the food reserves in the roots of alfalfa or clover plants. However, there was enough time for 4 to 8 inches of regrowth. The first 6 inches of regrowth takes up food reserves in the plant root. At about 6 inches of top growth, the plant begins to restore food reserves to the plant root. Fall harvesting that allows for this limited amount of regrowth results in plants that are low in vigor. Such plants are more susceptible to cold injury, ice-sheet damage, and heaving. There is nothing we can do at this time to save these fields, other than providing surface drainage.

Some hay fields were harvested or grazed-off during late October, November, and December. The food reserves in the roots of alfalfa and clovers in these fields will probably be at a high level, and the plants will not suffer from the removal of the top growth. But heaving may still plague such fields if the soils are wet during the late winter and if most of the top growth has been removed by grazing or harvesting. Retaining a 4- to 6-inch stubble may be a wise decision for the winter-spring of 1972-73. This amount of stubble will provide an insulation blanket over the soil and will reduce the frequency of alternate freezing and thawing. Also, the insulation will probably keep the soil cooler; thus,

it will remain frozen longer, or closer to spring time. As long as the soil is not alternating between freezing and thawing, there will be no heaving. The insulation provided by a tall stubble keeps the soil from thawing until there are only a few nights of freezing temperatures. If you are grazing hay or pasture fields with alfalfa or clover as the primary species, you may want to control the grazing pressure so there is adequate stubble left by February and March to insulate the soil; or, you may want to apply straw or strawy manure to heavily grazed fields.

Heaving problems with alfalfa and clovers are usually the worst in the southern third of Illinois, where soils are poorly drained naturally, where snow cover is usually lacking, and where late-winter temperatures fluctuate around the freezing point more nights and days than in the northern two-thirds of the state. Because of the extra wetness of the soil this winter throughout Illinois, heaving should be expected in all areas, but is likely to be most severe in southern Illinois.

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Spring Tillage—Alternatives for Wet Soils

Wet soils pose tillage problems--especially in the springtime if plowing was not done in the fall. Cloddy seedbeds, low soil temperatures, soil compaction, and delayed planting are examples of problems associated with tilling wet soils in the spring. Such problems are particularly severe on soils that have inadequate drainage (internal or surface) and high clay plow layers--silty clay loam, silty clay, or clay. The severity of the problem also depends on the previous crop. The residues from corn stalks and soybeans represent two extremes.

SPRING TILLAGE FOLLOWING CORN

Heavy corn stalk residues slow down the drying and warming of the soil. Chopping or shredding the corn stalks will help incorporation. This operation can be carried out in late winter or early spring, while the soil is frozen. The chopped or shredded stalks will be easier to incorporate with later tillage operations, but there is a risk of these stalks becoming matted in between the corn rows. Disking the undisturbed corn stubble in the early spring will help cut the stalks and will partially incorporate the stalks so there will be less interference with soil drying.

The Moldboard Plow

In wet springs, the moldboard plow can be used on soils with good drainage but will pose problems on soils with restricted drainage. Spring plowing--especially with wet soils--should be shallower in order to minimize the volume of wet soil that has to be moved for seedbed preparation. A plow depth of 4 to 6 inches should be adequate. Secondary tillage after plowing is most effective in breaking down clods, if this is done after the plowed surface has dried for a few days. Once over with a disk and harrow or with a cultipacker will often be adequate on the spring-plowed surface that has "weathered" for a few days. The excessive use of a disk, harrow, or cultipacker will compact the soil and will slow the adsorption of spring rains. The rain will either accumulate in the upper few inches or run off of compact soils.

The Disk

A tandem or an offset disk may be used as a primary tillage tool in place of a moldboard plow. Disking 3 to 5 inches deep will incorporate about half of the corn stalk residues and will loosen the soil--allowing it to dry out and become warmer than the wet, untilled soil. The initial disk operation may be followed with a disk and harrow operation just ahead of planting. A field cultivator and harrow can be used instead of the disk and harrow. Pesticides can be incorporated with either of these secondary tillage combinations.

Since the disk does not bury all the residue, volunteer corn could be a problem where harvesting losses were heavy. This "weed" is especially troublesome in fields planted to soybeans. Herbicide applications may need to be adjusted upward with disk tillage for effective weed control in corn and soybeans. Exceptionally heavy corn stalk residues may interfere with mechanical cultivation with disk and other mulch tillage systems.

The Chisel Plow

The chisel plow is most effective in dry soils. Deep chisel plowing in the spring is not effective in shattering wet soils. If a chisel plow is used in the spring, a shallow operation of 3 to 4 inches will create fewer problems. If the chisel plow is equipped with sweeps and is operated essentially as a field cultivator, the problems of spring chiselling will be minimized. With a disk or a chisel plow, weeds and volunteer corn are more likely to present problems than when a moldboard plow is used.

Zero-Tillage

Corn or soybeans can be planted directly in an untilled seedbed if a zero-till planter is available. These planters are equipped with coulters that cut through the trash and open a slit for the planter shoe. The zero-till planters are also heavier, which helps the coulters and planter shoe penetrate a firm soil surface. After planting, herbicides are utilized to control weeds and other undesirable vegetation. A light disking ahead of planting may increase herbicide incorporation, help cut up the stalks, and help the planting operation in a modified zero-tillage system. The loosening effect of the disk may also permit mechanical weed control.

Strip-Tillage

These systems provide for seedbed preparation in a band about 12 to 16 inches wide. The rest of the soil surface is left untilled until after planting. Some strip-tillage systems, such as the till-plant system, provide primary tillage and planting in a single operation. Others may employ rotary tillage or chisel tillage in the row area and leave the interrow area untilled until after planting. The rotary tiller or strip-chisel tiller can be used for mechanical weed control after the corn seedlings have emerged. Strip-tillage systems require special equipment that is not available on most Illinois farms.

SPRING TILLAGE FOLLOWING SOYBEANS

Soybean residues weigh less than corn residues and pose less of a residue-handling problem. In addition, soybeans have a loosening effect on the soil, so that disks or field cultivators can be used effectively as primary tillage tools. Following soybeans, a single trip with disk and harrow or with a field cultivator and harrow will usually provide satisfactory seedbed preparation. Yields following soybeans are likely to be comparable with a wide variety of tillage.

WHICH TILLAGE SYSTEM IS BEST?

No tillage system is best for all conditions. Shallow tillage appears to offer advantages in a wet spring. Mulch tillage, such as the disk- or zero-tillage systems, may permit earlier planting; but this advantage can be partially offset by slower early growth and more difficulty with weed control, compared to clean tillage with a moldboard plow. The "best" tillage system is the one tailored to fit the situation on a particular farm.

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Spring Seeding Hay and Pasture

The major species of perennial hay and pasture plants adapted to Illinois can be seeded in early spring throughout the northern three-fourths of the state. Spring seedings of these crops in the southern quarter have usually been less successful than seedings in late August or early September.

Spring seedings may be made with or without a companion crop, such as spring oats or winter wheat. The chances of establishing vigorous, uniform stands of hay or pasture crops are better if no companion crop is seeded with them. When hay or pasture crop seedings are made with a companion crop, spring oats is the best choice. The seeding rate of the spring oats should be at 1 to 1.5 bushels per acre. This will reduce the overly competitive influence of a vigorous oat crop. Spring oats and the hay or pasture-crop mixture should be seeded at the same time. Most of the hay or pasture-crop mixture can and should be seeded on top of the soil and covered very lightly, about half an inch. If the seedbed is firm before seeding, rolling after seeding with a corrugated roller will firm the hay or pasture-crop seeds into the soil surface without placing them too deep. If there is difficulty getting smooth brome grass seed through the seed box, mix the smooth brome grass with the oats and seed at a very shallow depth--just into the soil surface with practically no soil covering. The corrugated roller will provide plenty of seed coverage in most situations.

Spring seedings of hay or pasture crops in or with companion crops should be made early. In the southern part of the state, late February to early March may not be too early if spring seedings are made with a companion crop. Mid- to late-March would be satisfactory in the northern area of Illinois.

Seedings of alfalfa made without a companion crop are capable of producing 3 to 5 tons per acre of high-quality hay in the seeding year. Other hay and pasture-crop species lack the seedling vigor and growth rate to achieve these high yields in the same year in which they are seeded.

Spring seedings of alfalfa or alfalfa and grass mixtures without a companion crop should be seeded in late March to early April, as soon as a good seedbed can be prepared. Soybean stubble may be disked, but ground with corn stalks will probably require plowing and disking. The seedbed should be fertilized according to soil test recommendations given in the *Illinois Agronomy Handbook*. Firm the seedbed *before* and *after* seeding with a corrugated roller. A firm seedbed is essential for the rapid germination and emergence of small-seeded legumes and grasses.

Seed at a little higher rate than usual if you plan to harvest two or three times during the seeding year. In the northern half of Illinois, alfalfa seeded alone can profitably be seeded at 18 pounds. In mixtures, use 12 pounds of alfalfa. If the seeding is done late in the spring or during the late summer with little or no seeding-year production anticipated, alfalfa should be seeded at 12 pounds per acre when seeded alone, and 6 to 8 pounds when seeded in mixtures.

A good time to check on weeds is three to four weeks after an early spring seeding. Most spring seedings without a companion crop will require a herbicide to control broadleaved

weeds. The herbicide 2,4-DB (trade names, Butyrac or Butoxone) has been very effective when applied according to label directions as long as the weeds are 1.5 to 3 inches tall.

About mid-May and every four to five days thereafter until harvest, check for damaging insects. Leafhoppers (a small, green, pointed-nosed insect) often create problems in the new seedlings. One insecticide application is usually all that is needed before the first harvest. Additional applications might be needed on second- and third-growth forage.

Harvest spring-seeded alfalfa or alfalfa mixtures about 70 days after seeding. The alfalfa plants should be in an early stage of flowering. If the stand was good and if the weeds and insects were controlled well, 1.5 tons per acre of hay can be expected about mid-June from an early April seeding of alfalfa or an alfalfa-grass mixture. Second and third harvests should be made every 30 to 35 days.

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AGRONOMY NEWS

crops and soils

April 23, 1973

Number 448

Hay-Crop Harvesting and Fertilization

The best time to harvest your hay crop and to fertilize depends somewhat on the kind of live-stock feeding involved and the work schedule on the farm. Production animals require feed that is high-protein and highly digestible. Hay for these animals should be harvested before the flowering period, except for birdsfoot trefoil, ladino clover, and red clover. Birdsfoot trefoil and ladino clover may be harvested at the 50-percent bloom stage, and red clover at 25-percent bloom without material loss in digestibility and protein content. Alfalfa should be harvested in the late-bud to first-flower stage; the tall grasses, such as orchardgrass, smooth brome grass, timothy, tall fescue, and reed canarygrass, in the late-boot stage to the time the heads are just emerging from the boot for highly digestible and high-protein hay. The second, third, and fourth cuttings should be made every 35 days.

Hay that is to be fed to mature animals on a low plane of production, such as nonlactating cows and ewes, may be more mature than hay fed to animals on a high plane of production. Most of these hay crops will have peak dry-matter yields if harvested near their mid-point in flowering. By harvesting the first cutting of alfalfa, red clover, and birdsfoot trefoil when they are 50 to 75 percent in bloom and grasses at their full head exertion, yields with a near high dry-matter content will be obtained for the year if the succeeding cuttings throughout the growing season are scheduled at 35- to 42-day intervals.

High-yielding hay crops remove and require large amounts of fertilizer nutrients. Many soils supply a large quantity of calcium, magnesium, phosphorus, potassium, nitrogen, and the like. The very fertile soils may need very little supplemental fertilizer to obtain high yields with hay crops. But our experience and experiments tell us that most Illinois soils require a sizeable investment in fertilizer in order to receive high yields of hay and pasture.

The soils of Illinois have been classified as to their capacity to release and supply phosphorus and potassium. In general, the soils that are high in phosphorus-supplying capacity are in the western and northwestern parts of the state, plus a narrow region along the Mississippi River in southwestern Illinois. The soils that are low in this capacity are in northeastern and southeastern Illinois. The central areas of the state have a medium capacity to supply phosphorus.

The soils of the northeastern quarter of Illinois are high to medium in their potassium-supplying capacity. Most of the soils of the southern third of Illinois are low in potassium-supplying capacity, with the exception of a narrow band along the Mississippi River. The sandy soils that are scattered throughout the state are also low in potassium-supplying capacity. The remaining soils of Illinois are medium to high in terms of this factor.

Soils that are high in their ability to supply either phosphorus or potassium may require about 50 percent of the nutrients removed by a hay or pasture crop to be replaced; but soils that are low in their ability to supply these nutrients, may require a 100-percent replacement of these nutrients removed by crops. Soils intermediate in nutrient-supplying capacity may need to have 70 to 75 percent of the nutrients removed by crops replaced by fertilization. Hay and pasture crops remove about 11 pounds of P_2O_5 and 50 pounds of K_2O per ton of dry matter produced. Legumes are slightly higher in their composition than grasses. For general fertilizer suggestions, the values of 11 pounds of P_2O_5 and 50 pounds of K_2O per ton of dry matter are suitable guidelines. A fertilization program for a particular hay or pasture field can be determined by closely estimating the yield expected from the field.

and the quantity of nutrients to be removed during the year, then multiplying this quantity by the percentage replacement required for each nutrient--according to the soil-supplying-capacity rating.

Apply phosphorus and potassium to hay and pasture fields when it is convenient in the farming program--except on sloping, frozen soils where water from melting snow or rains runs off readily. Wait until such soils are thawed. For the greatest response of phosphorus and potassium, apply them in early spring before much crop growth occurs or after the first harvest.

Nitrogen is not needed where hay and pastures have a legume content of 30 percent or more. Grass fields or ones that are nearly all grass will need additional nitrogen for top yields. Bluegrass should receive 60 to 80 pounds of nitrogen per acre in the early spring; timothy, 100 pounds also in the early spring. Smooth brome grass, orchardgrass, and reed canarygrass, should receive 75 to 125 pounds in early spring, and again after the first harvest or grazing cycle; tall fescue, 100 to 125 pounds after the first harvest, and again after the second harvest.

Summary. For high quality hay, harvest most hay crops just before they flower. For highest yields, harvest these crops at 50 to 75 percent of the flowering stage, and every 35 days until fall. Fertilize most hay or pasture fields after the first harvest or grazing, if fertilizer was not added in the spring. Bluegrass and timothy are exceptions. They are not likely to produce much through the summer months, even if they are fertilized after the first harvest.

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URBANA, ILLINOIS



AGRONOMY NEWS

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crops and soils

May 21, 1973

No. 449

Field Tours

University of Illinois at Urbana-Champaign
Agronomy Research Centers and Fields

SEE RESEARCH IN PROGRESS. HEAR DISCUSSIONS ON TOPICS OF
CURRENT INTEREST ABOUT CROPS AND SOILS.

Field	Date	Time (CDT)
Ewing ¹	June 8.	1 p.m.
Brownstown	15.	8:30 a.m.-noon
Urbana (Agr. Day)	21.	7:30 a.m.-1 p.m.
DeKalb	29.	8:30 a.m.-noon
Carbondale ²	July 24.	1-3 & 6-8 p.m. ⁴
Belleville ³	26.	1-3 & 6-8 p.m. ⁴
Dixon Springs.	Aug. 9.	10:00 a.m.
Ewing.	24.	1 p.m.
Hartsburg.	28.	1:30-3 p.m.
Kewanee.	29.	1:30-3:30 p.m.
Aledo.	30.	1:30-3:30 p.m.
Carthage	31.	6 p.m.
Brownstown	Sept. 6.	8:30 a.m.-noon
Toledo	7.	6 p.m.
DeKalb	11.	8:30 a.m.-noon
Dixon.	12.	1 p.m.
Elwood	13.	1 p.m.

¹Demonstration field operated by Agr. Extension Advisers in the Ewing Area.

²Operated cooperatively by Southern Ill. Univ. and the Univ. of Ill. at Urbana-Champaign.

³Operated by Southern Illinois University.

⁴Two separate starting times (same program).



Agronomy Research Tours

See and hear research reports on

*Soil fertility
Crop varieties
Weed control
Insect control
Plant diseases
Tillage practices*

*Extension advisers and agronomy specialists will conduct tours, lead discussions,
and answer questions.*

*L.V. Boone
Agronomist*

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BANA, ILLINOIS



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crops and soils

May 30, 1973

Number 450

Alfalfa—The Protein and Energy Factory

Hay and pastures are a very important source of feed for beef cattle, dairy cows, horses, sheep, and sows. Hay and pastures are often criticized for being low in energy. For most livestock on a production program, some supplemental energy feed is needed, but hay and pastures can supply a large quantity of energy and nearly all of the protein requirement for most ruminant animals.

Alfalfa, "Queen of the Forages," is really a protein and energy "factory." The human resources of management that go into the factory involve variety selection, seeding rates, seeding methods, pest control, and harvesting. Other resources, such as fertilizers and bacteria to inoculate the root for nitrogen fixation, are added. The leaves capture the energy from the sun. This energy drives the photosynthesis process, which forms energy compounds and proteins that are used in respiration and to build plant parts. We can measure the net gain of the plant in the amount of protein, energy, minerals and vitamins, and fiber developed. This we call *growth* or *production*.

What value do the products of an alfalfa crop have? As a feed for ruminant livestock, the feed-nutrient components of alfalfa can be compared to the nutrient equivalent of corn and soybean meal. Since the prices of corn and soybean meal are well established, the equivalent feed value of a particular quality of alfalfa hay can be determined.

The nutrient composition of feeds such as alfalfa, corn, and soybean meal for ruminant animal nutrition has been reported by the National Academy of Sciences in their publication *Nutrient Requirements for Dairy Cattle*. The protein and energy components of these three feeds are shown in Table 1.

Table 1. Average Composition of Feeds

	Dry matter	Digestible protein <i>percent</i>	Crude protein	Net energy, calories per lb.
Average-quality, early bloom alfalfa hay.	90	12	18	0.57
Corn, No. 2 shelled 54 lb./bu.	89	7.5	10	1.10
Soybean oil meal, solvent extraction	89	43.8	51.5	0.94

Source: National Academy of Sciences, ISBN 0-309-01916-8, 1971.

Comparing alfalfa with corn and soybean meal is done by matching the amounts and composition of the corn and soybean meal to equal an amount of alfalfa. Table 2 shows that 33 pounds of shelled corn plus 22 pounds of soybean oil meal has the same nutrient content as 100 pounds of average-quality, early bloom alfalfa hay.

Table 2. Nutrient Components, Alfalfa Hay vs. Corn and Soybean Oil Meal

	Alfalfa hay, avg.-qual., early bloom	Shelled Corn, No. 2	Soybean oil meal, solvent extract.
No. of pounds.	100	33	22
Digestible protein (lb.)	12	2.5	9.6
Net energy (calories).	57	36.3	20.7

The economic values of the corn, soybean oil meal, and alfalfa are shown in Table 3.

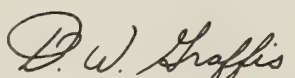
Table 3. Economic Values of Corn, Soybean Meal, and Alfalfa

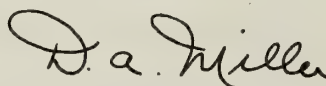
Pounds of feed	Price		Cash value
	Per unit	Per pound	
33 pounds of corn.	\$1.50/bu.	\$0.0268	\$0.88
22 pounds of soybean oil meal.	\$200/ton	\$0.1000	\$2.20
Based on corn and SBOM prices, 100 pounds of alfalfa hay is worth	\$61.60/ton	\$0.0308	\$3.08

On a feed-nutrient-equivalent basis, the average quality of early bloom alfalfa hay is worth \$61.60 per ton, when soybean oil meal and No. 2 corn are worth \$220 per ton and \$1.50 per bushel, respectively. A yield of 8 tons per acre of alfalfa hay is equivalent to 5,280 pounds of corn (94.3 bushels), plus 4,464 pounds of soybeans (74.4 bushels) in digestible protein and net energy. High-yielding, good-quality alfalfa is VALUABLE.

Production research on alfalfa at the University of Illinois has established these facts:

1. Oats is the best small-grain companion crop in which to establish alfalfa.
2. If alfalfa is seeded in oats, the oats should be harvested before grain maturity--as either silage or hay. The oats should be harvested when the oat grain is in the late-milk to early dough stage.
3. Alfalfa may be seeded in the spring without a companion crop, especially in the northern two-thirds of Illinois.
4. A FIRM, FERTILE seedbed is desired to help control depth of seeding and to retain soil moisture near the seed. Seeds should be placed on a firm seedbed, and FIRMED into the seedbed by press wheels or a corrugated roller.
5. Seeding needs to be done as early in April as possible.
6. A herbicide will usually be needed for spring seedings made without a companion crop. Preemergence and postemergence herbicides are available.
7. Potato leafhoppers should be controlled with a proper insecticide application. This insect can severely stunt a new seeding, if high populations are not controlled.
8. The first crop should be harvested when plants are in the quarter- to half-flowering stage. Harvest subsequent cuttings at 32- to 35-day intervals, until about September 1. Do not harvest or graze the crop the first fall or winter.
9. Fertilizers should be applied according to crop yields and the nutrient-supplying capacity of the soil.


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June 12, 1973

Number 451

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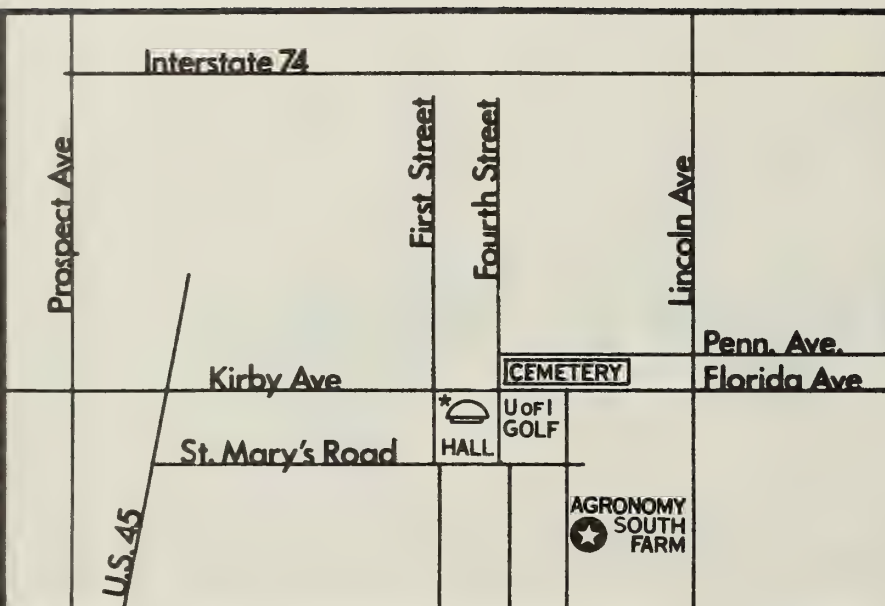
get your answer from us

ui
agronomy
day
june 21

Get on-the-spot answers to your crop production questions in the "Crop Problem Diagnosis Tent" at Agronomy Day. University of Illinois specialists will be on hand to discuss weed, insect, disease, nutrient, or other crop-production problems. Just bring a sample of your crop problem to the specialists in the tent. If they can't give you an immediate analysis, they'll keep your sample for further study and provide you with an answer as soon as possible.

Field Tours

- *SOYBEAN VARIETIES AND GERM PLASM
- *HOW WEATHER AND SOIL MOISTURE AFFECT CORN YIELD
- *ZERO-TILL DOUBLE CROPPING IN ILLINOIS
- *REVEGETATING COAL MINE "GOB" PILES
- *SMALL GRAINS FOR ILLINOIS
- *WAXY, HIGH-LYSINE AND HIGH-OIL CORN
- *ALFALFA: PROTEIN AND ENERGY FACTORY
- *COVER CROPS, SOYBEANS, AND ENVIRONMENTAL QUALITY
- *NITROGEN RESEARCH ON SOYBEANS
- *LIMESTONE, N, P, AND K FOR 1974
- *WEED CONTROL IN SOYBEANS
- *TOTAL-FARM WEED CONTROL



* ASSEMBLY HALL



- ☐ Agronomy Day tours start at 7 a.m. New tours will start every 10 minutes thereafter until 1 p.m. Each tour lasts about 2 1/2 hours. Fewer stops and less walking this year. But more to see at each stop.
- ☐ If you fly into the U. of I. Willard Airport call 333-2965 for transportation to the Agronomy South Farm. There will be parking on the grounds for those who drive.
- ☐ Lunch will be available on the grounds and there will be a refreshment stand.

W. R. Oschwald

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